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THE

DIAGNOSIS OF DISEASES

OF THE

BRAIN, SPINAL CORD, NERVES,

AND THEIR

APPENDAGES.

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J. RUSSELL REYNOLDS, M.D., LOND.,

UNIVERSITY MEDICAL SCHOLAR, ASSISTANT PHYSICIAN TO THE HOSPITAL FOR SICK CHILDREN.

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TO

MARSHALL HALL,

M.D., F.R.C.P., F.R.S.S., L. & E.

ETC. ETC. ETC.

This Work is Dedicated,

AS A TRIBUTE OF RESPECT

TO THE

RESEARCHES AND GENIUS

WHICH HAVE CONTRIBUTED LARGELY TO THE ADVANCE OF

PHYSIOLOGY AND PATHOLOGY:

AND AS

A TOKEN OF GRATITUDE

FOR THE

FRIENDLY COUNSELS AND KIND SUGGESTIONS

WHICH LED THE AUTHOR, WHEN COMMENCING HIS STUDENT'S LIFE,

TO A COURSE OF STUDY AND LINE OF THOUGHT

FROM WHICH HE HAS DERIVED

THE DEEPEST PLEASURE.

PREFACE.

THE motives which have induced me to write the following work are those which, I imagine, must actuate every author in entering upon a similar employment. They are, the importance of knowledge upon the subject; the deficiency of such knowledge, and of the means for its attainment; and the hope that some part at least of that deficiency may be supplied.

It is quite unnecessary to make any lengthened comment upon the first of these motives. The value of diagnosis, in relation both to prognosis and treatment, is at once and universally admitted; and the only difference of opinion which can or does exist is, with regard to the limits beyond which diagnosis may lose its practical utility. However, the majority of the medical profession feel that diagnosis should be carried as far as possible; for although the immediate results of certain differentiations may be imperceptible in their direct influence upon treatment, there is much satisfaction to be derived from the simple fact of knowledge; and we cannot but believe that its progressive increase must eventually alleviate the sufferings and lessen the sorrows of humanity, even should it be found that the laws of life and death are but little affected (except with detriment to the individual) by interference with the laws of nature.

By the application of a true system of pathology, hygiene, and therapeutics, practical medicine is so directed that it does not interrupt the processes of nature, but assists their development, by placing the individual in the best circumstances for the accomplishment of their destined results. Little more than this can be either expected, or desired: but for the application of such a system the essential pre-requisite is diagnosis; understanding by that word the recognition of an individual case as belonging to a certain category of disease, the general laws of which form part of the systematic science; so that the particular case in question is thus known to have a certain probable issue, and to require a special kind of medicinal, general, and social treatment.

That our power of diagnosticating cerebral and spinal diseases is far less than that which we possess with regard to the derangements of any other system of organs, which are equally frequent, is generally admitted. We constantly hear it said that a patient has had an "apoplectic attack," a "convulsive seizure," or that he suffers from "some affection of the brain or spinal cord," and this without any attempt being made to discover whether the anatomical basis of these groups of symptoms is congestion, softening, hæmorrhage, chronic meningitis, tumor, or any other definable disease.

This ignorance arises partly from the obscurity of the diseases themselves, and partly from deficient acquaintance with those facts which have already been employed by others to remove some portion of that obscurity. To supply the want created by the essential difficulties of appreciating the true character of nervous diseases requires an elaborate examination of the subject—*i. e.*, of the relation subsisting between structural changes or conditions and morbid functions, and the establishment of a true system of pathology by a detailed natural history of disease. This is not the object of the present work, and the reader is referred for such information to the works of Lallemand, Bouillaud, Andral, Marshall Hall, Fardel, Rostan, Valleix, Herpin, Foville, Louis, Martinet, Ollivier, and others. But this reference, which does much injustice, by its omissions, to many who have laboriously studied diseases of the nervous system, is sufficient to indicate one source of the other deficiency, which it is my object to endeavour to supply.

Many have neither the leisure nor the inclination to wade through the voluminous writings of the authors whose names I have mentioned; and the student of medicine finds his time occupied with the reading of such "systematic authors" as may be prevalent in the school at which he studies, and it is quite out of his power to become acquainted with more than one or two of the monographs to which allusion has been made. In order, therefore, to supply the deficiency which I felt when at college myself, and which others have often expressed to me since, I have undertaken the present work, in order to place within reach of the student's time, and the practitioner's leisure, those facts which have been elicited by others and by myself, so far as they bear upon the diagnosis of nervous diseases. Nothing can be further from my thought than the presumption that this little book can supply the place of those greater works, many of which must remain as models of scientific investigation, and as replete with important information so long as disease is one object of human study; and nothing can be further from my wish than that any, who have within their power the acquaintanceship of such authors, should rest satisfied with this or with any other book which does but give them assistance in rising to the first step in practical medicine, the diagnosis of individual diseases.

The manner in which I have endeavoured to accomplish the object that was in view will be obvious from a glance at the table of contents. The differential diagnosis of individual diseases is preceded by some chapters on "the objects" to be attained, and upon the terms employed. Reasons are given for adopting a clinical classification of diseases—*i. e.*, for forming large groups which may be readily recognised by their general and prominent characters; and after presenting, in a separate chapter, the diagnosis of these groups, special diseases are considered, and the means for their differentiation are pointed out. This has been done in a similar manner throughout; the diagnosis of allied affections is not given in a directly antithetic form, but the symptoms of each disease (so far as they are of diagnostic value) are grouped, and placed in distinctly lettered paragraphs, so that it is perfectly easy to compare and contrast those of one affection with those of another; for example, the mental, motorial, and sensorial phenomena of hæmorrhagic apoplexy are stated in lettered paragraphs, and so are those of softening, in order that by a comparison of the two series their differentiation may be at once accomplished.

Several diseases, as, for instance, tubercular meningitis and urinæmia, occupy a position in two or more chapters, and this is necessitated by their clinical differences; but should it be wished to obtain a connected view of the diagnosis of a particular anatomical condition in its several clinical forms, this can be accomplished by means of the Index, which will at once refer to the several chapters under which the disease is represented, as it is presented phenomenally under different phases during life.

Knowing well the many difficulties which beset any endeavour to arrange diseases of the nervous system, and to point out their diagnosis, I cannot but be conscious that imperfections and inaccuracies must creep into an attempt which embraces so wide a range of phenomena. It must further be distinctly understood that I do not for a moment think that the lines of differentiation which are pointed out in the following pages are either final or satisfactory in their application to all cases of disease; since, many individual instances are met with, of which it is impossible, in the present state of science, to frame an accurate diagnosis. A consideration of the points suggested may, however, make this possible in the majority, and enable the observer to carry the diagnosis so far as it has been carried hitherto; it may enable him to distinguish clearly between those diseases which are diagnosticable, and others which are not; and, even in the latter, more systematically to observe their phenomena.

GROSVENOR-STREET,
April 18th, 1855.

CONTENTS.

PART I.—GENERAL.

PAGE

CHAPTER I.—THE OBJECTS OF DIAGNOSIS AND ITS LIMITS.

First Object, Locality of Lesion 2
Second „ Nature of Affection (functional change) 6
Third „ Anatomical Condition 10

CHAPTER II.—THE ELEMENTS FOR DIAGNOSIS.

I. Intrinsic Symptoms 14
Modifications of Volition 15
„ „ Ideation 22
„ „ Emotion 25
„ „ Sensation 27
„ „ Motility 32
II. Extrinsic Symptoms (Local and General) 45

CHAPTER III.—THE CLASSIFICATION ADOPTED.

Reasons for not framing a Classification upon either Anatomical or Physiological basis 48
Clinical Classification 51

CHAPTER IV.—THE DIAGNOSIS OF LOCALITY, GENERALLY.

Of Extrinsic from Intrinsic Diseases 52
Diseases of the Brain, Cord, and Nerves from each other . . 57
Meningeal from Central Diseases 61

PART II.—DISEASES OF THE BRAIN.

CHAPTER V.—DIAGNOSIS OF BRAIN DISEASES, AS TO THEIR GENERAL NATURE.

Acute.
Febrile, or Inflammatory Diseases 63
Apoplectic Diseases 64
Diseases marked by Delirium 65
Convulsive Diseases 66

PAGE
Chronic
Diseases Marked by Exaltation of Function . . . 68
„ „ Decrease of „ . . . 69
„ „ Excess and Defect in Combination . . 69

CHAPTER VI. The Differential Diagnosis of Acute Febrile Diseases affecting the Brain.

Simple Meningitis (of the Convexity and of the Base) 71
Tuberculous „ (in the Adult, and in the Child) . . . 75
Rheumatic „ (or Meningeal Rheumatism) 80
Inflammation of the Dura Mater 82
Cerebritis (General and Partial) 82
Continued Fever, with Cerebral Complication 84
Gastric Remittent Fever (of Children) 87
Simple Hyperæmia ("Determination of Blood") . . . 88
Delirium Tremens (Febrile form) 88
Mania (of Febrile type) 89

CHAPTER VII.—Differential Diagnosis of Apoplectic Diseases.

Congestion, or "Coup de Sang" 91
Hæmorrhage (Hemispheres, Ventricles) 94
Arachnoid Hæmorrhage 100
Serous Effusion 101
Acute Red Softening 102
Tumor of the Brain, or Meninges 105
Tubercular Meningitis 106
Urinæmia, and Diathetic Conditions 107
Morbus Cordis, Anæmia, &c. 112

CHAPTER VIII.—Differential Diagnosis of Diseases marked by Delirium.

Hyperæmia Cerebri 115
Acute Softening 117
Delirium Tremens 118
Diathetic Diseases 121

CHAPTER IX.—Differential Diagnosis of Convulsive Diseases.

Eccentric, Toxæmiæ (Exanthemata, &c.) 123
Eccentric Irritation 125
Centric, Idiopathic (Dynamic) 128
Congestion 130
Softening 132
Tubercular Meningitis 133
Tubercle and Tumor of the Brain 135
Hæmorrhage 136
Hypertrophy 137
Acute Chorea 138

CHAPTER X.—Differential Diagnosis of Acute Hyperæsthesiæ.

Cephalalgia, Extrinsic Origin 139
Intrinsic „ 140

CHAPTER XI.—Chronic Diseases, generally.

Difficulty of Distinction, &c. 141

CHAPTER XII.—DISEASES CHARACTERISED BY EXALTED ACTIVITY. PAGE
Excessive Ideation—Hypochondriasis 145
Tarantism, &c. 147
Excessive Sensation—Hemicrania 148
Hallucinations 150
Illusions (Sensory Vertigo, &c.) 151
Excessive Motility—Motor Vertigo 156
Co-ordinated Spasm 157
Chorea 158
Tremors (paralysis agitans) 163

CHAPTER XIII.—DISEASES MARKED BY DIMINUTION OF FUNCTION.
Anæsthesia Muscularis . - 165

CHAPTER XIV.—DISEASES CHARACTERISED BY THE COMBINATION OF INCREASED AND DIMINISHED FUNCTION.
Hysteria 168
Epilepsy 173
Tumor 182
Chronic Meningitis 187
Chronic Softening 190
Chronic Induration 193
Chronic Hydrocephalus 196
Urinæmia 197

PART III.—DISEASES OF THE SPINAL CORD.

CHAPTER XV.—THE DIAGNOSIS OF SPECIAL LOCALITY, AFFECTED.
Region (Cervical, Dorsal, Lumbar) 198
Column (Anterior, Posterior, Lateral) 200
Histological Elements (Grey and White Matter) 200

CHAPTER XVI. — DIAGNOSIS OF SPINAL DISEASES — AS TO THEIR GENERAL NATURE.
Modifications of Conductive Functions 201
„ „ Centric „ 203

CHAPTER XVII.—ACUTE DISEASES OF THE SPINAL CORD AND ITS MENINGES.
Plethora Spinalis 207
Meningitis 208
Myelitis 210
Meningo-myelitis 212
Tetanus (idiopathic) 213
Hydrophobia 214
Hæmorrhage 214
Concussion 216

PAGE

CHAPTER XVIII.—CHRONIC DISEASES OF THE SPINAL CORD.
Myelitis 217
Meningitis 219
Induration and Hypertrophy 220
Tumors, &c. 220
Paraplegia (Idiopathic) 221

PART IV.—DISEASES OF THE NERVES.

CHAPTER XIX.—GENERAL CONSIDERATIONS.
Excessive and Diminished Activity of Function . . . 224

CHAPTER XX.—THE DIAGNOSIS OF SPECIAL DISEASES OF THE NERVES.
Organic—Neuritis 225
Tumors 227
Inorganic—Neuralgiæ 228
Hypercineses 230
Anæsthesiæ 232
Acineses 232

APPENDICES.

APPENDIX A.—ON THE SENSORI-MOTOR GANGLIA.

APPENDIX B.—ON THE RELATION BETWEEN FUNCTIONAL DISTURBANCE AND STRUCTURAL CHANGES.

APPENDIX C.—ON THE RELATION BETWEEN VOLITION AND INVOLUNTARY MOVEMENTS.

THE

DIAGNOSIS OF DISEASES

OF THE

BRAIN, SPINAL CORD, NERVES,

AND THEIR

APPENDAGES.

PART I.—GENERAL.

CHAPTER I.

THE OBJECTS OF DIAGNOSIS, AND ITS LIMITS.

THE clear statement of a problem removes much difficulty from its solution; and, in order to elicit the truth from nature, we must ask questions which bear upon that truth. We must know what it is we wish to find out before we commence the process of its discovery. We must, therefore, state at the outset what we are endeavouring to find, or, in other terms, what are "the objects of diagnosis," before detailing the means by which those objects may be attained.

The problems of which this treatise is intended to offer some solution are threefold, and may be stated thus:—

FIRST,—Given, a certain class, or group of phenomena, to find the organ or organs affected; in other words,—given, the symptoms to discover the locality of lesion.

SECOND,—Given, the symptoms and the organ affected, to find the nature of the affection.*

THIRD,—Given, the symptoms, locality, and nature of the affection, to discover its anatomical conditions.

---

* The result of this second inquiry (the nature of affection), may be stated in two classes of terms:—

A. Dynamic—*i. e.* a general statement of the affection in pathological phrases; such as depression or exaltation of this or the other function.

B. Static—*i. e.* an account of the anatomical conditions which induce or underlie such pathological (dynamic) results. The order adopted in the text is preferred to this division of the second problem.

FIRST.—LOCALITY, OR ORGAN AFFECTED. The earliest and most important distinction we have to make, is that of the extrinsic from the intrinsic diseases of the nervous system.

I. *Extrinsic diseases.* This term is employed to denote all those collocations of nervous symptoms which depend upon some general morbid condition, rather than upon the particular state of the nervous system itself. It is not intended that this treatise should contain a *resumé* of all the various phenomena of disturbance in the nervous functions resulting from derangement, of the nutritive processes generally, or of some particular organ; but that it should point out the means for distinguishing certain well-marked groups of "nervous symptoms," when the attendants upon such changes in the vegetative sphere, from those which are induced by primary alterations in the function or structure of the nervous centres themselves.

Frequently the symptoms of these two classes are closely allied, and they may complicate each other. We cannot state positively, that in the case of nervous symptoms arising from extrinsic disease, there is any morbid condition of the nervous centres themselves; for the symptoms in question may be nothing more than the appropriate reaction of those centres upon the special stimulus brought in contact with them. The really diseased element is the stimulus.* For example,—the coma or spasmodic movements which result from the presence of urea, some urinary constituent, or from opium in the blood, do not indicate disease of the brain or spinal cord. They may be as truly the physiologic or healthy result of those conditions as sleep is the result or sequence of exertion, and contraction of the pharyngeal muscles the consequence of an impression on the mucous membrane of the fauces.

The importance of such distinctions, in respect of treatment, renders it imperative, in every case, to seek first for the presence of any general organic conditions of disease, to which all the symptoms may be referred ; and in the event of their discovery, to examine carefully their nature, and appreciate their value. But if such indications are undiscoverable, we then (and not until then) infer the existence of disease or derangement in the nervous system itself.

---

* The word "stimulus" is here used in its widest meaning ; viz., the exciting cause, or occasion of nervous action.

II. *Intrinsic diseases.* This expression is intended to include all those groups of morbid phenomena which depend upon functional or structural changes in the nervous system itself, and its immediate appendages, the meninges, &c. There are three well-marked lines of distinction, which, from their evident relation to anatomical and physiological characters, will be adopted in the present work. They divide, of course, the encephalon, the spinal column, and the nerves.

A. *The Encephalon.* This has to be considered separately, in respect of the nervous tissues themselves and their meninges. It often happens that this distinction cannot be established satisfactorily, disease of the one being so frequently complicated with derangement of the other; but in many cases the separation is quite possible, and in some there is little, if any, room for doubt.

1. The nervous structures of the encephalon are to be resolved into the cerebrum, cerebellum, and sensory (or sensorimotor) ganglia. It is often quite impossible to affirm the locality of disease, even with such rough precision (if the term may be used) as to separate these well-marked anatomical elements; but in some cases—as of tumor, for example—this may be accomplished.

a. The cerebrum. We may in the majority of structural diseases determine which lateral half is affected; and in particular cases we may arrive at strong probability that the lesion is situated in certain portions of the cerebrum, such as—

i. The substance of the hemispheres, with the occasional discrimination of cortical (vesicular, grey) from central (medullary, tubular, white) substance, especially in inflammatory affections.

ii. The ventricles. The occurrence of hæmorrhage (for example) into these cavities may sometimes be distinguished from effusion into the substance of the hemisphere.

iii. The base of the brain, and

iv. Its superior surface. Inflammation of the brain-substance and of the meninges presents different symptoms when occurring in the two latter situations.

b. The cerebellum. Much obscurity yet hangs around our appreciation of the proper functions of this organ, and the modifications which its diseases may occasion in the processes of life; but there are reasons for thinking not only that some of its diseases may be recognised during life, but that we may separate, more or less accurately, those which affect—

i. The centre, or processus vermiformis, from those seated in—

ii. The lateral lobes.

c. The sensori-motor ganglia. It appears to me that we are compelled, upon physiological and patholico-clinical grounds, to consider these bodies as nervous elements, equally distinct from the cerebrum, cerebellum, and spinal cord, as either of the latter is from the others. (For some of the reasons for these opinions see Appendix A.) Certain diseases, such as softening, for instance, appear to have a special proclivity for affecting these organs; and there are some dynamic changes which are more satisfactorily referred to a morbid condition of their functions than of any others. In the present state of our science we are unable to determine which ganglionic mass is affected; but the progress of research may render it possible to distinguish

i. The corpora quadrigemina.
ii. The thalami optici.
iii. The corpora striata.
iv. The pons Varolii.

2. The meninges, and coverings of the brain. Under certain circumstances, to be discovered by the history and commemorative progress of a case, we may distinguish diseases of

a. The pia mater and arachnoid, from those of

b. The dura mater.

The symptoms in the main arising from the influence which meningeal conditions exert upon the functions of the underlying organs, it is possible sometimes to distinguish meningitis (for example) of the base from that of the convexity of the brain. The primary commencement of disease in the dura mater may often be inferred from its connexion with morbid conditions discoverable in the organs of special sense, or from the existence of disease in

c. The bones of the cranium, and

d. The integuments, and subintegumental tissue.

B. *The spinal column.* We have here to observe a distinction similar to that pointed out with regard to the encephalon: the separation of disease in—

1. The spinal cord itself from that of its meninges; and the same remarks apply with regard to the occasional difficulty of such a discrimination. However, in many instances, the diagnosis may be made, and we have further to mark out the locality of lesion in respect of—

a. The region affected. Sometimes the precise limitation of disease may be established, and minute examination will commonly differentiate

i. The cervical,
ii. The dorsal, and
iii. The lumbar regions.

b. The column, or columns, implicated.

c. The grey, or white matter. With respect to the two latter, there is much more doubt; but the discrimination of their diseases as separate elements should be borne in mind in relation to symptoms and post-mortem appearances, even when during life we cannot assign the point of contact of the two.

2. The coverings of the cord. In many cases it is quite easy to determine the anatomical elements in which disease has commenced, although at an advanced period all the tissues may be involved. Some morbid conditions of the spinal cord are more frequently associated with disease of the bones than are any allied conditions in the brain. We have to distinguish diseases of—

a. The meninges, and

b. The bones. The latter affording frequently most important aid.

C. *The nervous trunks.* The precise symptoms, and the ordinary course of disease in these prolongations of the nervous centres have yet to be systematised. There are occasionally met with cases in which some phenomena are to be referred to many of these trunks. The most important, because the most frequent, and those whose morbid conditions are the best known, are:—

1. Cranial nerves (or having origin and exit from the cranium).
    a. Sensory.
        i. The trigeminal, or fifth nerve.
        ii. The pneumo-gastric.
    b. Motor.
        i. The third, or motor oculi.
        ii. The sixth, or abducens oculi.
        iii. The portio dura of the seventh.

2. Spinal nerves. Any one of these may be affected, and we have to distinguish diseases of—

a. The anterior, or posterior roots (motor, or sensory divisions) and also

b. The region, or portion of trunk implicated.

SECOND PROBLEM.—NATURE OF THE AFFECTION.—It will be immediately recognised that (as stated in note, p. 1.) there are two methods in which this object may be viewed, or rather that there are two "stand-points" from which it may be considered. The term "disease" may mean the morbid phenomena and processes which are present, or the modifications induced in the functions of life; and in this sense it is merely a general expression of the group of symptoms. It may mean, on the other hand, the cause of these morbid phenomena; the organic conditions upon which they depend; or the physical (anatomical) lesion which underlies the symptoms.

The general agreement between symptoms produced by dissimilar physical lesions of the nervous system, and their frequent disagreement when arising from apparently similar causes, show that we have not yet arrived at a correct appreciation of the point of contact between the two; at the same time they lead us to believe that it is not so much the nature of these physical changes as their degree and mode of induction which determines the result. If the future progress of pathological research should effect the harmonisation of these two categories of disease, it has failed to do so up to the present time; and it is more consistent with truth to maintain their separation, pointing out whenever and wherever we can the places in which one may impinge upon the other.

Having discovered the probable locality of disease, it is our next object to know its general character; *i.e.*, the nature, quoad function, of the change induced. For example, the head is displaced from the erect position by some abnormal disposition of action in the muscles of the neck, and we have to discover whether paralysis on the one side or spasm on the other is the cause of such displacement. A man suddenly falls to the ground, senseless and helpless, with stertorous breathing, and we have to find out whether this is an acute apoplectic seizure, or whether it is one of many other phenomena of chronic epilepsy.

These illustrations are quite sufficient to make apparent the object and scope of the following classification of diseases; or rather, of general pathological conditions, which shall represent "the nature" of nervous affections.

I. *Acute diseases.* These are separated from chronic not merely by their relation to time, but by the severity of their symptoms, and by their simultaneous development. Some diseases, which, although they may persist for a long time (the only change in their phenomena being a gradual and very slight diminution of their intensity), are, nevertheless, at their onset, so suddenly induced, and carried so rapidly to their highest point of deviation from health, that we are compelled to place them in the list of acute affections. Hemorrhagic apoplexy affords an illustration of this class; but, on the other hand, some diseases (as, for example, acute softening), though rapid in their passage to a fatal termination, may be developed so insidiously and gradually in certain instances, that, until undeceived by death, we may have looked upon them as chronic affections of rather trifling importance.

However, as a general rule, no difficulty will be felt, and the acute diseases will be readily distinguished, and separated into two classes, the febrile and non-febrile.

A. Febrile diseases, or those accompanied with the signs of general febrile disturbance, such as heat of skin, high pulse, thirst, general oppression, anorexia, &c. The most important diagnoses to be made are the distinction of—

1. The specific fevers, with nervous complication, from
2. Febrile excitement, the result of the nervous state.

Although this is a part of the general question of locality (the differentiation of intrinsic and extrinsic diseases) it does not fall completely under that head; and it is only necessary to make reference to the difficulty of distinguishing meningitis with fever of typhoid type, from true typhoid fever with meningeal irritation, to indicate the importance of such a separation.

With the exception of a very few diseases, the affections of the nervous centres, even though referrible to the organic conditions of inflammation and its results, are not marked by high fever. The greater number fall into the second list—

B. Non-febrile affections; marked by

1. Diminution, or loss of functional activity. This constitutes the large class of apoplectic and paralytic diseases.

2. Increase, or excess of action, recognisable under three prominent groups formed by the natural endowments of the several organs:—

a. Sensibility: the most marked characteristic being pain.
b. Motility: its main features being convulsion and spasm.
c. Ideation: marked by the occurrence of delirium.

These various modifications of nervous function are presented in every form of combination; but their most frequent groupings are the subject-matter of ulterior classification rather than the object of the present chapter.

II. *Chronic diseases.* As may be gathered from the remarks upon acute affections, the term is used to express not only the time but the severity of disease, and its mode of gradual development. However, no one of these characteristics must be taken by itself, and made the basis of division; since, for example, the severity of pain in many neuralgiæ, essentially chronic in their course, is excessively intense, and may be developed with full force in the first attack. The "time" comes to be of great importance in the diagnosis of these cases; and we must, in all instances, take a general view rather than fix our attention upon particular characteristics.

The different nature of chronic diseases may be arranged thus:—

A. Those marked by excessive functional activity—

1. Of sensation; *e.g.*, neuralgiæ, hallucination, &c.;
2. Of motion, instanced by chorea, &c.;
3. Of ideation, as observed in the hypochondriac, &c.

B. Those characterised by diminution, or loss of functional activity.

1. Of sensibility, in anæsthesiæ, &c.;
2. Of motility, in paralyses, &c.;
3. Of mental activity, in dementia, epilepsy, &c.

C. Those presenting different elements of A and B in combination.

The following combinations are excessively common in many organic diseases; *e. g.*

1. Loss of motility, with increased sensibility. (Paralysis with pain.)
2. Loss of mental, with increased motor activity. (Coma with spasm.)
3. Loss of sensibility, with increased motility. (Anæsthesia with reflex spasm.)

To enlarge upon this scheme would be to entrench upon the subject of the next chapter (the means for diagnosis). The two mutually illustrate each other, and we can arrive at knowledge upon the diseases of the nervous system in only the same manner as upon every other subject; *i. e.*, not by the progressive addition of element after element in a linear series, but by the simultaneous consideration and apposition of each class of truth in its relation to the others. It is by careful examination of the symptoms in their threefold relationships of locality, function, and structure, that we can arrive at conclusions with regard to either; and the correct interpretation of symptoms being a matter of great difficulty, a separate chapter is devoted to their consideration.

The heads given in this section are those under which the morbid conditions of function in an organ may be ranged, when, by careful examination, the seat of disturbance has been discovered: and thus the second object of diagnosis is obtained.

THIRD PROBLEM.—THE ANATOMICAL CONDITION. Some of the conditions referred to in this section occur much more frequently in one portion of the nervous system than another; others are common to them all.

I. The nervous organs may be healthy; (*i. e.*, so far as our present means of investigation enable us to decide the point.) There are many diseases in which there is no reason to believe that the nervous centres undergo, necessarily, any static or physical change, although, during life, there may be most marked and important symptoms. Allusion is made to the class of diseases known under the names of epilepsy, chorea, hysteria, neuralgia, &c. &c.; and it is not unphilosophical to believe in the existence of morbid functions without demonstrable physical lesion, since the material world presents us with similar relations between the static and dynamic properties of matter. This treatise is not the proper place for a discussion of the question at issue, but some remarks will be found upon it in the Appendix.* Although many of these affections will come under notice, the most numerous may be ranged under the second group:—

II. Diseases accompanied by some physical change in the organs.

A. Without change in the tissues themselves.

1. Blood abnormal in quantity.

a. Anæmia; or, in less degree, Hypæmia. It is not proposed to decide, either positively or negatively, the question as to whether more than a fixed proportion of blood can find its way into the brain. It is certain that very different apparent vascularity is discoverable post mortem, and that there are two classes of nervous symptoms dependant upon the amount of blood in the brain, if we may form any estimate from the demonstrable varieties of its amount in the body generally.

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* *Vide* Appendix B.

b. Hyperæmia; distinguishing the old-fashioned—
  i. Active; arterial; or "determination;" from
  ii. Passive; venous; or "congestion."

These distinctions, inasmuch as they cannot be recognised post mortem, have recently received less attention than they merit. Their symptoms are different when occurring as simple elements of disease; and they are still more diverse when presented as the complications, or secondary results of other and more serious lesions.

2. Blood abnormal in quality; whether arising from—
  a. Specific fevers; typhoid and exanthemata:
  b. Retained secretion-elements; urinæmia, icterus, rheumatism:
  c. Introduced poisons; alcohol, opium.

3. Excess of serous effusion in ventricles, or arachnoid cavity.

B. Diseases having textural changes in the organs.
  1. Homologous, or normal products, &c.
    a. Inflammation, with exudation and suppuration.
    b. Fibrinous exudation, with induration or adhesion.
    c. Softening, and vascular changes.
    d. Hæmorrhage, and transformed hæmorrhagic clots.
    e. Fatty, or calcareous degeneration of vessels.
  2. Heterologous, or abnormal products.
    a. Deposits in tissues, not of independent growth—
      i. Tubercle (granulation and crude tubercle);
      ii. Carcinomatous infiltration;
      iii. Cretaceous deposit.
    b. Growths, vascularised or increasing—
      i. Hydatids;
      ii. Fibrous and osteoid tumors, &c.

It is not intended that this summary should be exhaustive.

It is rather a simple classification of those forms of organic change which may, any one of them, under certain circumstances, be inferred with much probability to exist in some portions of the nervous system. The object of this treatise is not descriptive pathological anatomy, but the relation during life of symptoms to static changes, and the means by which a diagnosis of the latter may be established by a due consideration and estimation of the former.

The means for arriving at a solution of the three problems stated in the outset may be given thus, in general terms:—

1. *The locality of lesion*, or the organ affected, is determined by—

a. The special quality of the symptoms—*i. e.*, the existence of morbid changes in a particular function or group of functions; which are at once referrible to (because the functions are the proper action of) a certain organ, or part of an organ. Thus, mental changes are referred to one, emotional to another, and sensorial to a third portion of the nervous centres.

b. The topographical distribution or limitation of the symptoms. For example, the unilateral or bilateral distribution of paralysis (hemi- and para-plegia).

2. *The nature of disturbance* is a general statement quoad function of the organic condition. If a diagnosis has been formed with regard to the first object, there is less difficulty in arriving at the second: the two classes of consideration mutually assist each other. The second problem is solved by a careful interpretation of the phenomena upon physiological and pathological grounds.

3. *The organic*, or *static condition* is determined, not from the particular character or distribution of the symptoms so much as from—

a. Their order of development;
b. Their proportion to each other;
c. From many extrinsic conditions;
d. From certain objective, physical signs;
e. From the application of general pathologic laws.

Pathological anatomy is a matter of inference only, during the lifetime of the patient. In many instances the inference is attended with great doubt; a doubt greater than that which attends the diagnosis of other classes of disease, owing to the larger number of subjective symptoms, or those for which we are dependant upon the statements of the patient. Still, in many cases we can arrive at approximative certainty; and there can be no doubt that—as it has happened in the past so it will happen in the future—increased exertions and more careful methods will be rewarded with increased success.

CHAPTER II.

THE ELEMENTS FOR DIAGNOSIS.

BY the term "Elements for Diagnosis," is intended the symptoms of disease, which furnish the means by which diagnosis may be established. These symptoms are so varied in their character, and are susceptible of such different interpretations, that it would be impossible to render distinct the meaning of all passages in the several chapters devoted to the diagnosis of special groups of disease, unless some definition were given of the terms employed. To introduce these definitions in the course of the chapters referred to would be both cumbersome and tedious; and it is, therefore, preferred to devote some little space to their consideration now. It will be at once apparent that such a course is necessary, if we call to mind a very few terms that are employed every day, and then consider what ideas are attached to them when made use of by different individuals. For example, the phrases "loss of consciousness," "loss of memory," "sopor," and "convulsion," mean very different things, or may mean very little, when employed, as they often are, carelessly and without distinct limitation.

The elements for diagnosis resolve themselves into two large groups, the intrinsic and extrinsic; using these words with the meaning already applied to them.

I. The intrinsic, or proper nervous symptoms, are essentially modifications of the manner in which the organs of the nervous system perform their functions; or, in other words, they are altered functions. As these are dynamic in character, we must group them upon a physiological rather than anatomical basis. And it is the more desirable to do so, since, in the present state of our science, the particular functions of different portions of the encephalon and spinal cord are very variously interpreted.

A. Mental phenomena. This group is composed of all those processes which make up the intellectual life of the individual; those properties which pertain to the man subjectively considered; the conditions of thought, volition, emotion, memory, judgment, &c., as distinct from simple motility and sensibility, which place him (objectively) in relation with the external world.

As in the latter phase or sphere of life there is a ready distinction practicable into the two groups of property, by one of which the individual derives impressions from without, and by the other of which he is enabled to act upon and from himself upon surrounding objects; so, in the higher operations of his own inner life, we may recognise two leading classes of mental function, the passive and the active: the former representing that condition in which mental and emotional processes, open to all the influences of suggestion and impression from without, may "gently lead us on," without determinate direction or definite end; the latter including those qualities of mind by which it earnestly engages itself, in the contemplation of its own internal operations, or of the modifications which they undergo from contact with the external world, and that spontaneous power by which all its actions may be directed to the attainment of a special object.

We have to consider separately volition and emotion, as the two extremes of mental action, with ideation as their intermediating link, sometimes in subordination to the one, and sometimes to the other.

1. Symptoms referrible to volition. Under this heading we should range those modifications of the will (or the direction of consciousness) which appear to be primary elements of disease. They may be recognised in relation to ideation, emotion, sensation, and motility; and it may be premised that very frequently certain morbid processes are referred to one of the latter, when, in reality, the primary change is in the exercise of volition itself. Illustration of this will appear as we proceed.

a. Volition in relation to ideas (or to ideation). We judge of this relationship by observing the kind and amount of influence exerted by the will in the acquiring of new ideas; in the recollection of old ones; in the direction and the use which may be made of earlier knowledge in its bearing upon the events and actions of the day. The symptoms of this class resolve themselves into—

i. Modifications in the power of attention (or the simple direction of consciousness), which may be those of excess or defect; and when the former usually indicate some perversion. Diminution may exist in any and every degree, until the faculty is completely lost. It may be estimated directly or indirectly, as pointed out under iii; being a most potent cause of the earlier so-called deficiencies of memory. The exaggerated attentiveness of the insane man, and the listless apathy of some epileptics, and of many hysterical subjects, present illustrations of this element of disease.

ii. Modified power of apprehension. An unusual quickness of perception is sometimes observed; but we have more frequently to encounter the inverse change of diminution. Its association with deficient attention is obvious, not only theoretically but practically; there are, however, cases presenting deficiency of apprehension, although the patient may be all eagerness and attention to what is going on. The distinction between the hysteric and the idiotic patient may well illustrate this point; in the former case, however, it is volition which is primarily at fault, in the latter, it is ideation. To this kind of case I am not referring now, except in support of the statement that it is not solely a question of attention. Loss of apprehension appears to be the second step in the process of volitional decay: the second external phenomenon of the internal deterioration.

iii. Changes in the faculty of recollection. Memory and recollection are not the same; we have a thousand things in our memory which we cannot voluntarily recal, although some suggestions, or "remindings" from without might instantly bring them back. It is questionable whether an impression once being made upon our minds, and having become the subject matter of thought, woven, as it were, into the fabric of our intellectual life, is ever effaced; although it may be lost for a time, and hidden under the accumulation of succeeding years, some new circumstances, some morbid condition, or some direct suggestion, may bring it to the light, and render it as clear and intelligible as on the day of its reception. Thus, the memory is the faculty of retaining, and the fact of retained impressions. Recollection, on the other hand, is the power of finding and bringing into use the facts or ideas which are retained.

Loss of memory, or more truly of recollection, is exhibited well by the epileptic. In its earlier stages and slighter degrees, the individual remembers accurately events that have long since passed, but cannot retain in his mind from day to day the trivial things which he may be told. The real cause of failure appears to be want of attention, so that impressions are but feebly made, and are very rapidly effaced. This slight degree of failure should be carefully distinguished (by an experimental reference to the power of attention) from that more serious condition, in which old ideas and associations are blotted out, or at all events rendered useless. The latter change is referrible to interference with the conditions or processes of ideation. (See p. 24.)

iv. Modifications in the power of directing thought. The condition of the mind during dreaming and quiet delirium, is that of thinking, apart from volitional control. In hysteria, we often find the patient mentally tortured by ideas which are perfectly free from voluntary restraint: she surrenders herself without effort to the chain of morbid notions. In opposite cases—for example, in some forms of mania—we find examples of the power which a morbidly-active will may use in perverting ideas from their true relations.

It is often a matter of much difficulty, but always one of importance, to separate the elements of disease, and interpret them correctly; and I believe it often happens that we overlook this class of derangement, which in great measure depends upon the individual, and for which he is responsible; and by referring its phenomena to some morbid physical conditions, lose the right direction for successful therapeutics. The epileptic and the hysteric have to be taught self-control, if we would gain any influence over their direful maladies.

b. Volition in its relation to emotion. Normally, there is a controlling and directing power, with regard to the influence of feeling upon thought, with regard to the intensity of the former, and the freedom of its expression. In disease this relation is disturbed, and we find many whose life is entirely guided by emotion, and though often guided correctly, is as often wrong. There are, as we know full well, constitutional differences in respect of the intensity and moulding influences of "the heart." Their treatment is one of the branches of education rather than of scientific medicine; but we too often have to deplore derangements arising from imperfect attention to the former, which no skill in the latter can avert.

In disease we may recognise very frequently—

i. Diminished control of emotion. It is a striking fact that many diseases anticipate the work of time, and present us, even in youth and middle age, with the characteristics of mental decrepitude. Insanity, chronic softening of the brain, epilepsy, hysteria, chorea, and many other nervous affections, produce in their subjects this loss of volitional control, which is so common when the powers of life are worn out by their long battle with the world. The loss of voluntary direction exists sometimes alone, but much more frequently it is associated with—

ii. Diminished control of expression. The patient laughs, and cries, and acts out his impulses without any attempt at their suppression. The two need not co-exist; the former is an internal change, sometimes to be discovered only by diligent search, and by gaining the "confidence" of the patient; the latter betrays itself at once in his tone, manner, and gesticulation.

c. Volition in relation to sensation. This relation is the "perception" of sensation; or, the mental intuition (formed idea) from a recognised external impression, as to the nature of its cause. The normal exercise of this faculty results in the establishment of a due equation between the intensity of its objective and subjective elements. The hypochondriac, never reaching such a correct interpretation, when afflicted with a pimple on his toe, feels all the tortures of the gout.

i. Morbid quickness of perception may be recognised as an element of disease. It is indicated by the rapid formation of ideas from all impressions (which ideas may be right or wrong, but) which evince a quick and keen intuition of meaning. This condition exists not unfrequently in children, whose nervous system generally is delicately constituted and unduly susceptible: it is found also in the hypochondriac, who not only exaggerates all his sensations, and with unhealthy rapidity interprets them to his own discomfort, but who can create them in accordance with his preconceived ideas. The maniac affords another instance of the manner in which a morbid Will can, with marvellous quickness of intuition, adapt everything that the individual hears, feels, or sees, into some confirmative evidence of his own delusion.

ii. Diminished perceptive power is evidenced by precisely the reverse condition. Perception may be absent altogether; and nothing which is said or done can then attract the attention of the patient. There may, however, in this state be distinct evidence not only of reflective sensibility, but of sensation itself. Sensori-motor phenomena occur; but there is no evidence, either from the phenomena of the time, or from the subsequent statements of the patient, that any mental perceptive power was present.

An individual in this state presents two conditions of ideation. When he lies perfectly motionless, cannot be made to utter a sound, and makes no attempt to do so spontaneously, we say that there is "loss of consciousness:" when, on the other hand, he is talking, coherently or incoherently, upon matters totally distinct from those around him, we say that he is "delirious." The expression, "loss of consciousness," appears to me objectionable, since it is merely an assumption that such loss exists—an assumption which the after-evidence of many cases has proved to be incorrect, if by that expression it is intended that the mind is inactive, and no self-consciousness remains. If, however, we mean that there is no consciousness of external impressions, the phrase is a bad one, since there is some consciousness of sensation (using that term in its literal meaning), as demonstrated by sensori-motor phenomena. What we do mean is, that there is no mental, internal consciousness (or appreciation) of external, physical change; and this circuitous expression is much inferior to the phrase, "loss of perception;" the latter conveying what exists in fact, so far as we are able, from direct observation and dim memory, to ascertain. This expression will be used in the succeeding pages, and will mean what is commonly understood by "loss of consciousness."

In delirium it is evident that consciousness exists; but there are, at the same time, evidences of a still farther and more complete removal of that consciousness from surrounding objects: and this condition gives additional support to the statement made above, that we are not justified in asserting such an absence, when all that we know is the absence of perception.

d. Volition in reference to motility. The relation between these two (like that which we have just considered) is not direct or immediate; neither is it possible for us to judge of its conditions, except indirectly or mediately. We can discover the presence of sensation and perception in others only by the signs which they may make: we can recognise the conditions of motility only by motion (objectively), and its described relation to the will of the patient (subjectively), as he may please to inform us. Thus the difficulty is sometimes very great to distinguish between immobility, the result of some lesion cutting off the muscles from their functional connexion with the centre of volition, and immobility from a simple want of exercise of will. The paralysis of hæmorrhage and of hysteria, for example, illustrate this difficulty. The morbid relations between volition and motility may be referred to one or the other of the following divisions:—

i. Power of occasioning movement. The normal standard of this faculty varies with the individual, and with his condition of health at different times; so that we can only regard extreme or unduly persistent variations from his habitual power in the light of morbid phenomena.

α. Excessive voluntary movement is often a marked feature of the maniac; violent actions are witnessed far beyond the ordinary strength of the individual; and, in other instances, where there is no increase of momentary energy exhibiting itself in excessive action, there is no less distinct evidence of increase, in the persistence of some movement, movements, or attitudes, during successive days and nights, without the shadow of apparent fatigue.

β. Defective volition in relation to motility. In certain conditions of general apathy and intellectual debility this state is observed, independently of any other nervous disease. It is one marked characteristic of hysteric paralysis, or rather apparent powerlessness. It is often observed in the organic weakness which follows excesses of various kinds. Patients of this kind loll about on sofas all the day long; and cannot, because they "will" not (have not the will to) move. Sometimes a certain group of muscles is fixed upon for inaction; sometimes the whole body is thus volitionally palsied. The characteristics of such a condition are—the manner of the patient, which shows the deficiency of will in all of its spheres for action; the occasional production of movement under the influence of strong emotion, or any accidental impression throwing the individual off his guard; the increase of paralysis when attention is directed to the limb, or when the patient is told he can move it, and he protests against such interpretation of his malady; and the variability of situation which the loss of power may affect.

ii. Power of directing movements. In many chronic paralyses the earliest indication of disease is a diminution of this faculty. (See "Anæsthesia Muscularis," chap. xiii.) It is much less a failure of the will itself than of the physical organism through which it acts. We may more confidently anticipate real disease from such a loss than from the decrease of power. In commencing paraplegia, it is the commonest symptom and the most perplexing. Often, however, it appears to be dynamic only, and there is much good to be derived from a cultivated exercise of volition in relation to certain movements. I have seen this well exemplified in the cure of stammering, by determinate reading aloud for hours together.

iii. Control of involuntary movement. The relation of volition to a-volitional movement is a subject of much importance, and of no little difficulty. The text of this treatise is not the proper place for its discussion, but I have placed in the Appendix,* some points which we may consider established, and which will aid in the appreciation of the present section. It is certain that the power which some individuals possess is very great, and it is evident that this faculty is diminished in others. In many spasmodic diseases having, probably, a real and uncontrollable origin, the movements persist after such primary cause may have been removed, owing to the want of attempt at their volitional control. There are instances in which the grotesque movements, often persistent when the general signs of chorea and allied affections have passed away, have been removed and overcome by a process of volition-education. In other cases such ugly phenomena remain, and afford very frequently the evidences of a faulty will, and not an unfortunate constitution, to which they are very often attributed.

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* *See* Appendix C.

2. Symptoms referrible to ideation; or, modifications in the processes of thought. These changes we can only observe indirectly in words, expressions of countenance, and actions; we are, therefore, uncertain in our knowledge, and open to many fallacies of construction. Some remarks have already been made upon the relationship of thought to will. We have now to consider:—

a. Ideation as related to external impressions. Normally, there is consentaneity up to a certain point among different individuals. We are so constituted, that certain phenomena, or the impressions which they make upon our organism should, in accordance with definite laws of thought, induce determinate mental processes, having a generic similitude in the whole human race. Naturally our minds are open to these suggestions from without, which not only furnish it with the materials of thought and action, but which, when wandering away from realities amid the mazes of its own varied reflections, can bring it back again to common sense, and give it a new point of contact with the truth. In disease:—

i. Ideation may be removed from the influence of external impressions; and then, by no means which we can adopt, are we able to arrest or change the course of thought. Though roughly handled, and loudly addressed, the patient wanders on, pursuing his own line of cogitation as if nothing had occurred, and yet in a moment we may see, by some accidental occurrence, that the faculties of sensation and perception are persistent. This form of delirium is by no means uncommon, but is to be distinguished from the following, in which,

ii. Ideation is in relation, but a perverted relation, with sensation. The individual in this state listens to what is said; he takes notice of surrounding objects, but construes them erroneously, sometimes in harmony with a fixed delusion which may have taken possession of his mind, sometimes without any link of this kind which others can discover. The patient of delirium tremens presents, not only this perversion, but, as is often the case in disturbed thought, a condition of hyper-ideation in which the mind is excessively fertile in conjuring up, with rapid succession, all kinds of egregious ideas, sometimes brilliant as the creation of Eastern fancy, sometimes darkened with the presence of " more devils than vast hell can hold."

b. Ideation in relation to internal sensations. Those perceptions which do not arise demonstrably from modifications induced by external impressions belong to this category. It is difficult to draw anything but an artificial line between the processes of sensation arising from some change in the organic conditions of the body, when on the one hand those conditions occur apart from, and on the other in dependence upon, external impressions. Still, the ideation which results from them is different: a man rarely understands, or interprets correctly, those so-called subjective sensations; and the hypochondriac presents us with the most absurd and gigantic inferences (ideas) from the most common-place and trivial sensations. This appears to be a distinct element of disease, and one which in its lower degrees may occasion much confusion.

c. Ideation as an independent process, that is, as taking place without immediate dependance upon impressions ab extra. The relations of thought to each other are manifold, and may be expressed under various denominations; but there are two great classes which we have to separate, and which it is the province and business of our inner life to separate, viz., the real or essential, and the unreal or accidental. The first mode of relation is an expression of, and is dependent upon, the logical or true affiliation of ideas, resulting from the nature of the ideas themselves; the second includes those accidental or unreal associations which pertain to words (the investiture of thought), such as their similarity of sound, &c., or which may have arisen from their simultaneous origination. It is an important property of mind that thoughts should suggest one another, and that they should do this in various ways. " Imagination" is a word employed to express the faculty and the product of novel associations which are created by the mind. " Fancy " is rather the unrestrained play of thought, than its directed creative action. " Memory" is an important link or element in the process, when we mean by that word retentiveness of impressions and ideas: it is the product of that process when used in the sense of "Recollection." The exercise of " Judgment" is shown in the appreciation (by a volitional effort) of the true links of association, *i.e.*, the truest or most logical arrangement of ideas which we can arrive at in the present state of science and of human intelligence. These faculties meet at various points, and are mutually interdependent; but their essential elements may be distinguished by careful observation and no less careful thought. The symptoms which we may recognise in various forms of disease may be placed under these heads:—

i. Loss of power to appreciate the logical sequence of ideas. The patient becomes bewildered when he attempts to pursue a train of thought. He may succeed up to a certain point, but then fails to continue. This is observed in many chronic diseases of the brain, such as softening, chronic meningitis, &c.

ii. Sequence of ideas rapid, but accidental (or, at all events, illogical). The patient rambles hurriedly from one thought to another, and has little or no power for their control or regulation. This is found in many forms of disease of which delirium is a symptom.

iii. The absence of all discoverable sequence: the conversation being utterly incoherent, and out of all due relation to external impressions. This is the case in some cases of softening, but is more common in the complete fatuity of dementia.

iv. Loss of memory, in its more severe forms; the absence of any useful recollection of past impressions. This is, of course, an important element in the production of incoherence, but sometimes we are unable to judge accurately of memory from the mere fact of incoherence.

v. Positively exaggerated ideation is the important feature of some forms of delirium. (See Volition in relation to Idea, p. 15.) There is intense rapidity and energy of thought which may be to a certain extent correct and sequential, but which is beyond the limits of average health. The over-anxiety and worry of business and professional life induce this condition of mind, and incapacitate men for active work, when there is no evidence of any further derangement. When such exaggeration of ideation (attended, as it often is, with insomnia, or harassing dreams), is complicated with ii. or iii. (deficient appreciation of sequence), the man is delirious ; when combined with vi. (delusion), he is insane.

vi. Perverted ideation, or the existence of fixed delusions, which no external impression and no power of volition can remove, or demonstrate to be false. This is, *pro tanto*, "insanity of mind."

d. Ideation in relation to motility. The excessive influence of ideas upon muscular action is witnessed in a certain class of people as their congenital or acquired constitutional peculiarity: the "table-turners," and "electro-biologic-subjects" are examples of such misfortune. As disease, the same tendency may be found in the hypochondriac, the hysteric, and choreic patient. The muscles are moved often in opposition to the will, and peculiar convulsive attacks occur, with strange palpitation, &c. &c., from the simple concentration of thought upon the subject. Ideas may be seen to affect muscles which are paralysed in respect of volition. (*Vide* motility, p. 33.)

3. Symptoms referrible to emotion. Under this group are included all those modes or frames of consciousness in which the individual may think, act, or be acted upon; the feelings of pleasure, displeasure, joy, or sorrow, &c. &c. (those states of consciousness), which an idea or sensation may produce; the wishes or motives which induce any course of thought or conduct. Thus, under the term emotion are grouped two classes of elementary processes ; the one active, the other passive. the former representing those feelings and instincts which are the sources and impulses of much personal and social action; the latter representing the condition of the individual, during his various forms of intercourse with the world, and in the recesses of his own heart.

a. Emotion considered as the source of action. Attention has already been directed to the relation between emotion and volition ; and it has been pointed out that this relation is often disturbed in disease, and that sometimes such disturbance is (as in hysteria) one prominent characteristic of the affection. The combination of diminished will and exaggerated emotion is such, that each morbid perversion adds intensity to the other.

Emotion, considered as embracing the various instincts, has to be taken into account in this enumeration of symptoms; the nutritive, sexual, and maternal impulses undergo various modifications, relating, however, rather to the natural history of insanity, than to the diagnosis of cerebral disease. It is sufficient for the purpose of this chapter to point out the fact, that these instincts may be exaggerated, perverted, or diminished, since, in the present state of science, their alterations throw little light upon our immediate object. The relation of emotion to motility will be discussed under the latter head. (See p. 34.)

b. Emotion considered as a state (rather than an action).

i. The "spirits," or frame of mind, may be unnatural. In children this is frequently one of the earliest indications of disease. It is the fact of change from the habitual condition, rather than the precise nature of that change, which it is important to observe. Unusual gaiety or cheerfulness is to be looked upon with as much suspicion as despondency or dulness. In old age an undue hilarity is often the only symptom of approaching decay. Some diseases are well known to have among their group of features, special conditions of emotion. In phthisis, "the temper, though irritable, is singularly hopeful. Every one has seen cases in which arrangements for future years are made within a few days of death ; and I have actually known the question of a change of profession complacently considered within three hours of the fatal event. . . . Hopefulness constitutes a special clinical feature of the disease, and cannot by any means always be explained by the absence of pain. Contrast the phthisical with the cancerous patient in this point of view." * Dr. Walshe is here writing of thoracic diseases, but the same characters are to be observed when the locality is different. The cachexiæ of carcinoma and tubercle present their own special features, whatever may be the structure in which their organic development takes place.

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* Walshe,—Diseases of the Lungs and Heart, p. 386.

ii. The temper is rather the occasional than habitual frame of mind, and, like the latter, may afford in its changes early indications of disease. We have to recognise as symptoms:—

α. Excessive irritability.

β. Perverted character (or unusual).

γ. Rapidity of change from one to the other extreme.

B. Symptoms not mental, but intrinsic; and therefore dependent upon modifications in the functions of some portion or portions of the nervous system. These resolve themselves into morbid conditions of sensibility and motility: the two poles, as it were, or points of contact between the individual (or inner life), and the general (external world), by which he is surrounded. The media by which self is placed in relation with not-self; the means by which objective and subjective phenomena become each translated into terms of the other. By sensibility (using that word in its widest range of meaning, and including perception) is intended that process and property by which certain parts of the organism are capable of converting impressions from without, or properties of the external world, into phenomena of consciousness, the passage from the objective to the subjective. By motility is intended the reverse; the process by which mental conditions become translated into physical acts. By sensibility, the individual is acted upon from without; by motility, the world is affected from within.

But there are relations between these two processes or properties into which consciousness does not enter as the necessary link; there are others of which it takes no cognizance whatever; these are the sensori-motor and reflective phenomena, and their modifications by disease are no less important than the former.

The most valuable information we can obtain in respect of diagnosis is found in the examination of these changes: their value depends upon their objectivity, which frequently renders them as free from the control of the patient, or the moulding influences of his mind, as are many of the physical signs by which we judge of diseases of the heart and lungs.

1. Symptoms referrible to sensation or sensibility. These

are manifold, as the qualities of matter to be appreciated are various. There is a certain definite proportion between the intensity of an impressing cause, and the sensational effect which it produces ; and this proportion, though differing with individuals, is, in the main, restricted during health within certain limits. It is important, therefore, to know both the typical amount, and the individual peculiarities. The physiological exaltation or depression of sensibility is sometimes general, but this is by no means universally the case ; for frequently we meet with great acuteness of one sense, and great obtuseness of all the others in the same individual. In diseased conditions there is sometimes partial, sometimes general change: the latter usually indicating a condition of general organic disease; the former, some structural lesion of a definite nervous element.

One other remark should be made, viz., that the intensity of a sensation depends upon several conditions. (a.) The intensity or force of the impressing cause. (b.) The amount of attention bestowed upon its recognition. (c.) The degree of change which is induced in the organism, dependent upon the novelty of the impression, or its habitual production. (d.) Constitutional peculiarities. (e.) The perfection or imperfection of the material organs for its reception and conveyance. We must, therefore, take all these conditions into account when interpreting the sensations of a patient. Some of the terms which will be used in this section are new, but they contain only the elements of expressions which we are constantly employing in regard to other symptoms, and they will be at once understood, and, I believe, seen to be more explicit than those which are more frequently in use.

a. Increased sensibility. " Hyperæsthesia," the word generally employed to express this condition, has included two very different modifications of sensibility: one being true hyperæsthesia, *i.e.*, the increase of impression-effect, undue acuteness of sensation ; the other, hyperalgesia (as it has been somewhat inaptly termed), marked by the occurrence of pain upon the production of any sensorial impressions. The difference between these two elements of disease is more than one of words, each modification has its own clinical relations ; and there is little tendency for them to co-exist. A simple contrast of the patients with meningitis, or tumor, who shun the light, and bury their heads in the bed-clothes to avoid all sounds, from the increase of pain which such impressions cause, but who neither of them present any real morbid acuteness of sight or hearing ; with the man of unsound mind, or the anæmiated and hysteric woman, either of whom can hear and see things which are hidden from the ordinary sense, but who may, at the same time, experience no pain from such sensation:—this contrast—will at once make evident the kind of distinction which is intended.

By hyperæsthesia, therefore, is intended the simple augmentation of sensorial power, apart from any relation to pain ; and except in minute degrees it is by no means a common symptom. It exists most frequently as a general condition, and is, therefore, probably referrible to the central portion of the sensorial apparatus. For example, the muscæ and tinnitus of anæmia (which indicate an hyper-acuteness of sensation), exist in common with generally exalted susceptibility, and are, probably due to the manner in which the organic condition of the body affects the brain. Genuine hyperæsthesia is most commonly attendant upon some mental change, or upon general systemic disease.

b. Diminished sensibility. The word "Anæsthesia" expresses the absence of sensibility, and this is more than is intended. It may be useful to restrict its meaning to this extreme, and for the several degrees of diminution short of this (absolute loss), to employ the term "Hyp-æsthesia." The condition which it expresses may be general or partial. In the former case, it is most commonly the result of systemic disease; *e. g.*, some abnormal blood conditions, typhoid, typhus, &c., or general cachexia, from the depravation of vital energy itself, as seen in tubercle and carcinoma. When partial, hypæsthesia is more commonly dependent upon local disease.

The essential characteristic is loss or diminution of sensibility; exhibited in the eye by confused, misty, ill-defined vision; in the ear by deafness, &c. ; in the general cutaneous sensibility by diminished tact. The focal distance, the amount of light required for reading print of fixed size, may be the means of measuring sight; the hearing-distance for the watch-tic, and Weber's method with the compasses, may measure audition and tact; placing sapid substances (colocynth, quinine, sugar) upon the tongue, and presenting odoriferous matters (assafœtida, lavender, &c.) to the nose, will become measures for the diminution of smell and taste.

The cutaneous sensibility should be examined in different manners; since there are different properties with regard to the recognition of which sensibility is not always simultaneously or equally effected: *e. g.*, changes of temperature may be recognised when pinching and pricking are not. Weber's method is probably the most accurate measure of the proper sense, tact.

The sense of sight presents similar complexity; there may be colour-blindness, though distinct appreciation of form persists. Hearing, also, may be lost for sounds above or below a certain pitch, but retained for every other.

c. Modified sensibility. In uniformity with the preceding words, this change may be termed "Met-æsthesia;" and it implies something more than a simple alteration of plus and minus. Hyperæsthesia, and anæsthesia, with their intermediate hypæsthesia, refer to changes in quantity; metæsthesia includes all changes of quality. The first to be noticed is:—

i. Dysæsthesia, or painful sensibility. By this term, I do not mean the occurrence of spontaneous pain here or there, but the definite production of pain by sensorial impressions from without. This, which is now frequently termed "hyperalgesia," has often been confounded with hyperæsthesia (see p. 28), but I have already mentioned examples and illustrations of their difference. The characteristic of dysæsthesia is, that sights, sounds, contact with foreign bodies, &c. &c., induce pain, without any necessary augmentation of the sensation. Meningitis affords, perhaps, the best illustration of dysæsthesia.

ii. Pseud-æsthesia, or the occurrence of false sensations. These include a great variety, which it is difficult to reduce to order, and for which it is often very difficult to account. Perhaps the recognition of the two following groups may aid towards their future appreciation of their morbid elements:—

a. Sensations arising from external impressions, but modified by subjective conditions. The modifications induced are manifold, and may be in respect of either of the following :—

(1.) Quality of sensation. Hot, taken for cold; noises, giving appearance of light, &c.
(2.) Quantity. A single body appearing double; diplopia.
(3.) Locality. The impression upon one part being referred to another; from arm to leg, and vice versa, &c. &c.

β. Sensations purely subjective in their origin, or arising, so far as can be ascertained, independently of all external impression. It appears that we are correct in believing, that with regard to sensation it is always the central change of the organism which the mind perceives, and that it is not the property of external, material objects. If so, a central change (analogous to that which the impression from without induces), arising spontaneously, may be referred (mentally) to the conditions which, experience teaches us, are usually the causes or occasions of such modification. Thus the so-called subjective sensations have their origin; but we are incompetent to assert whether this origin is purely mental, or whether it depends upon some central organic (physical) change. It may be that sometimes one, and sometimes the other, is the case; and there are reasons for thinking that the delusive appearances of insanity are the product of a disordered mind, whereas the pseudo-sensations of hysteria are those of a diseased nervous system. Whether this be the case or not, we may distinguish:—

(1.) Sensations referred outside the body; the spectra which haunt the vision of the insane man, and the sufferer from delirium tremens; the sounds which they hear; and the oppressive weight which they feel thrust upon them, &c.

(2.) Sensations referred to the body itself. These are exemplified by various neuralgiæ, by globus hystericus, vertigo (of subjective form), and the thousandfold sensational creations of the hypochondriac. Occasionally they may have a peripheral organic basis, but more frequently they depend upon some centric conditions, or are to be regarded as phenomena of disordered mind.

2. Symptoms referrible to motility. These resolve themselves (phenomenally) into muscular contraction, or its absence; and their diagnostic value depends upon our recognition of the various causes or conditions of such contraction, and the relations which may subsist between them. We have separated for us by disease the following groups of variation:—

a. Modified relation of motility to volition; which may be:—

i. Increase of voluntary movements and power. This is observed in mania, and in some cases of violent delirium. The facts presented are the augmented force, persistence, and often variety of voluntary motion; and whether this excess is due to the augmented energy of will, to the increased contractility of the muscles, or to a combination of the two, we may be unable in all cases to decide; but the fact remains, and is generally connected with some derangement deeply and extensively affecting life in all its spheres of action.

ii. Decrease or absence of voluntary power. "Paralysis" is the familiar term to express this condition. Phenomenally, the patient is unable, by an effort of the will, to move his muscles. Volition itself may or may not be present; when it is present the attempt is made, but without success. When there is loss of perception we may not be able to determine accurately whether or not consciousness and volition remain. The two are probably generally, but certainly not always, coetaneously affected. However, when consciousness is so far excluded from communication with the outer world that we can obtain no direct evidence of volition (by speaking to the patient, and watching the effect), we may often gather that some limbs are cut off from its influence, by observing their motionless condition, when the patient makes an attempt to move; by the lifeless manner in which they fall, when raised by the observer; and by the attitude of inaction which they assume.

It should be mentioned here, that besides the diminution of power, there is often loss of direction and combination in the voluntary movements, which, so far as practical utility of a limb is concerned, often renders it almost as useless as if completely paralysed. (See relation of motility to sensation, p. 35.)

b. Motility as induced by ideation. The relation between these two vital properties has only recently received the attention it deserves from the physiologist and pathologist. It is with much pleasure that I refer the reader to Dr. Carpenter's "Principles of Human Physiology," 4th edition, for an able *resumé* of our knowledge on this subject in its physiological relations. In disease, we may recognise most distinctly:—

i. Increased ideo-motility. This term sufficiently explains itself, but some illustrations will render it more readily appreciable. The gesticulations of many patients when suffering from cerebral disease, their emphatic manner (quite unusual to them) when talking of the most trivial subjects, is striking evidence (when taken, as it is commonly found, in conjunction with other signs) of disorder in the processes of ideation. The influence of idea upon the choreic patient, in exaggerating his grotesque movements; its power to induce an attack in the epileptic; the ease with which palpitation of the heart or spasm of other muscles may be set up, when the mind is directed towards them, afford farther illustration. Catalepsy, tarantulism, &c., are phenomena of a similar character, and are to be separated in their clinical history (with those just mentioned) from emotional phenomena. Farther, ideo-motion remains in limbs paralysed to volition, not only in the cataleptic, hysteric, and æstatic patient, but in other cases of paralysis less questionable in their origin.

ii. Diminished ideo-motility takes the form of diminished power of motion, from the presence of a fixed idea that it is impossible. This is often seen in so-called hysteric paralysis, and in some abnormal cases in which there are no distinct evidences of the hysteric constitution.

c. Disordered relation of emotion and motility. A limb that is paralysed to the will trembles under strong emotion, sometimes more notably than that on the healthy side. Emotion is the occasion of movement. In disease we find—

i. Emotional movements in excess. Chorea, hysteria, epilepsy, &c. &c., present us with examples. Grimaces are made; laughing and sobbing noises occur; any excitement produces tremor; the slightest fright causes starting; and all these movements are beyond the pale of volitional control. Volition is, however, generally positively diminished, and this adds intensity to the involuntary movements.

ii. Diminished emotion-motility. This is seen sometimes as an isolated phenomenon in the muscles of the face; but the observation of emotion-motility is of more importance in relation to the question whether paralysis (in respect of volition) is due to lesion of the brain or spinal cord. Stated generally, in the former case the emotional movements remain, in the latter they are absent.

d. Motility in relation to sensation. The paralysed limb often starts (with the rest of the body) at a sudden noise, or a flash of light. It is in obedience to sensation (although frequently such sensations are, mentally, unperceived) that many of our movements are guided and controlled. As Mr. Mayo has said, " we lean upon our eyesight as upon crutches," and although the due relation between sensation and motility is almost unconsciously preserved, and thus unnoticed, during health, an undue relationship at once reveals itself by marked and distinctive symptoms.

i. Increased sensori-motility. This commonly co-exists with the last hypercinesis, but it is a separable element. The constitutional peculiarities of individuals are widely different; one man can have his arm amputated, without the contortion of a muscle, without the escape of a groan, or "long-drawn breath;" not only this would be utterly beyond the power of another, or of the majority, but the slightest suffering, or uneasy sensation even, in many people, induces attitudinizing, sobbing, sighing, groaning, and every expression of bodily torture. These movements are not voluntary, though they are in health subject to volitional limitation. The startings of patients upon sudden noises, their shrieks when touched, and their grimaces and groans, are the signs either of a defective volition, of a morbidly susceptible sensori-motor apparatus, or of the two combined. Squinting is produced in the child by a sudden noise; and this, with the peculiar automatic movements of the limbs now and then observed in softening of the brain, tubercular meningitis, and other cerebral affections, are probably examples of this kind of motion; since the combinations observed are frequently such as transcend any explanation by reference to idea or emotion. There is an irritability of bladder and rectum in hysteric patients (leading to frequent micturition and defecation), which is merely a phenomenon of this kind.

ii. Diminished sensori-motility. The paralysis to sensation, or that form in which, although sensation may be *per se* unaffected, there is an absence of sensational guidance. An object is held in the hand, and is grasped firmly, so long as the eyes are directed to the act, or so long as the attention is steadily fixed upon its maintenance; but the moment that the mind or the eye is turned away, the muscles relax, and the object falls. The eye may thus keep up movements that the muscular sense cannot, but the reverse is also true. This form of paralysis, which has been referred far too exclusively to some condition of the cerebellum, is not due to the absence of volitional power, for the latter is frequently entire, and the patient can contract his muscles with their habitual force. Neither is it owing to the loss of cutaneous sensibility, for frequently this remains intact; but the involuntary relation between the two is lost, and hence most disorderly movements occur when any voluntary motions are attempted. The combination of this condition with that in which the individual cannot tell, without looking at them in what position his limbs may be placed, has led to the expression, "loss of muscular sense." It is not necessary, nor would it be appropriate, to discuss the theory of such a sense in this treatise, but it may be remarked that we do not know of this sense except in its relation to movement, and loss of intrinsic power for muscular guidance appears to be a less exceptionable phrase.

This phenomenon I have frequently found to exist alone in patients who have been termed paraplegic, and it is certainly one of the earliest signs of that affection; but it ought to be carefully separated (semeiologically) from paralysis in the ordinary sense of the word. There is in the same class of patients the antithetic condition of bladder and rectum to that noticed in the preceding section.

e. Motility in relation to reflection, or a-sensual impression. The sensori-motor phenomena are reflective, and involuntary; but they differ from those of this class in having sensation as a more or less necessary link between the impression and the motor impulse. The essential characteristics of pure reflexion are the absence of any cognizable sensation, and volition; the peculiar jerking, sudden, transitory movement, immediately following the application of a stimulus; and the necessity for re-application of the stimulus to induce the movement.

In health, the reflective functions are (as Dr. Hall, to whom we are indebted for our systematic knowledge of the subject, has pointed out) those processes of involuntary motility, which sustain the ends of our organic (nutritive) life, by placing it in relation with the material world, by which it is surrounded, and from which it is to derive its support; the movements of respiration, ingestion, and ejestion, which go on so constantly, and so independently of the will, that their existence is scarcely noticed. But in its pathological conditions the reflective function presents us with many of the most obvious and most frightful symptoms of disease. In this chapter only two classes of alteration will be noticed:—

i. Excessive reflection. By this term, is intended a general exaltation of the property, whether represented phenomenally by increased power, frequency, or persistence of movement. The special characteristic of reflex actions must be borne in mind; they may be found existing as an isolated condition of disease, but more commonly underlying some extreme symptoms, from which (latter) several diseases have derived their specific names. It may be well to point out now some illustrations of the phenomena in question. They commonly exist in childhood, especially during the first dentition, and are reproduced to some extent with the second, and I have found them accompanying the protrusion of the dentes sapientiæ. This increase of reflective activity, forming one of the physiological peculiarities of childhood, acts as a predisponent to pathological results, should any abnormally intense stimulus be brought to bear upon the child. The increase may exist, however, to a pathological degree, and then we find a train of symptoms calculated to aid us in the diagnosis of essential or idiopathic convulsions. The same train is to be found in the epileptic and hysteric patient. The phenomena are essentially those of exaggerated motility: thus, in the muscles of the face contractions occur, causing various grimaces; and these are especially common around the mouth, inducing clicking noises with the lips; the eyelids wink, the eye-balls do not act consentaneously, but strabismus is frequent, and a peculiar "roll of the eye," showing the white sclerotic beneath the upper lid; oscillation of the eye-ball, and flickering movements of the lids take place during sleep; there is grinding of the teeth, occasioning a peculiarly unpleasant sound when the patient sleeps; and when he is awake the teeth are commonly clenched. Occupation of the mind increases some of the contractions, others, verging upon the "expressive" movements, are exaggerated by any emotion.

These two elements (of emotion, and reflective-motility in excess), so commonly combined in the same patients, may be separated by a study of their relation to sleep, or to the withdrawal of attention: the choreic movements, for example, cease; but the essentially spinal phenomena not only persist, but are exaggerated.

In the muscles of the neck reflective movements are very common. Dr. M. Hall has advanced that this region is, *par excellence*, the seat of emotional and reflective movement. It has not yet been shown with what relative frequency contractions take place in it, and in other parts of the body; but from my own examination (of eighty cases of epileptics, for example), I cannot find that the neck is more commonly affected than other parts of the body. It is very difficult to arrive at a positive conclusion on the subject, since so many of these phenomena pass unnoticed by the patient, and we are unable to assert what occurs during the intervals of observation.

Under the head of "epilepsy," there are some further remarks upon the subject. We may, I believe, infer the existence of muscular contraction from some of its secondary results: for example, occasional diplopia may give a suspicion of strabismus, although we do not witness the latter: and so the feelings of vertigo, with darkened face, confused thought, &c., accompanying a sensation of constriction in the throat, as they not unfrequently do, may warrant a suspicion (I do not think more than a suspicion) of trachelismus (see hysteria).

Deglutition and respiration are clumsily performed: the latter is often suspirious, yawning, and irregular; and, frequently, during even the waking state, accompanied by a peculiar semi-stertorous sound, especially when the mind is absorbed by some other consideration.

The muscles of the extremities exhibit similar tendencies. Clonic spasms occur in any of them, and often interfere with the execution of volitional movement. The most common phenomena are the carpo-padal contractions. The sole of the foot is turned inwards, the toes bent downwards, the hands are clenched, and the thumbs drawn in. These are of great frequency in children, and may be observed most readily during sleep, both in them, and in the adult. Reflex movements of the lower limbs, and even of the whole body, may be induced by tickling the soles of the feet. The extreme symptoms of reflex exaggeration are found in general spasm and convulsion. There is, in conjunction with these phenomena, very frequently constipation of the bowels, and this condition, taken in connexion with the changes of respiration and deglutition described above, leads us to ask the question, whether there is, in some cases, anything more than a morbid transference of reflective activity from its proper sphere, the apparatus of organic, to its unnatural sphere, the muscles of animal life?

The existence of reflective excess when in combination, as it often is, with paralysis to volition, may be judged of by the readiness and force of contractions arising from peripheral irritation, such as pinching, tickling, or applying heat to the soles of the feet, palms of the hands, &c., and by the occurrence of clonic spasm.

ii. Diminished reflection. When there is general and absolute loss of reflection, life is immediately extinct, from asphyxia. But the loss may be partial. This is the case in those traumatic or "spinal paralyses" (as Dr. M. Hall terms them) which arise from "exclusion of the cord," either by its intrinsic disease, or by injury to the nervous trunks; but spinal disease, sufficient to sever volition and sensation from a segment of the body, does not necessarily induce true spinal paralysis. The movements of respiration may be limited by cutting off the abdominal and intercostal muscles from their centre of motor impulse. The bladder and rectum may be reflectively palsied in the same manner, and accumulation of urine and fæces takes place; the erection of the penis is impossible. Deglutition may be rendered difficult in the same manner; the signs of reflective paralysis are the absence of reflection-movements; retention and palsy. It is the absence of such paralysis that it is important for us to discover, in many instances, and this is to be ascertained by the presence of those movements, from irritation of the skin, which are described in the preceding section. We must distinguish between the sensori-motor actions, the true reflex, and the centric spinal, which will fall under our notice now. The bladder and rectum afford a diagnostic means of great importance.

f. Motility in relation to centric irritation: the tonic contraction or spasm of muscles (the former in health, the latter in disease). This appears to be a function of the spinal cord (not reflex), which normally results in the steady firmness of the limbs, maintained by a constant, but equable contraction of their opposed muscles. The contraction is persistent, and hence a notable difference from the reflective. Pathologically we may recognise:—

i. Excessive tonic contraction. The rigidity of limbs in hæmorrhagic apoplexy, in chronic softening, and various organic changes of the brain, are phenomena of this kind. Meningitis of the cord presents a striking example of the condition. There is not in this kind of hypercinesis distortion of the limbs as there is when, from simple muscular tonicity, the flexors overpower the extensors ; tonic spasm of centric origin is not so persistent as this muscular contraction; it is increased by attempts at movement; the attempt occasions pain, and often centric disturbance.

ii. Diminished tonic contraction. When this affects the muscles of an extremity, or the whole system of animal life, the result is a loss of firmness and resistance ; together with a want of steadiness in movement, and an absence of perfect rest (positive equilibrium), when no voluntary efforts are being made. Tremor and paralysis agitans afford examples of these conditions when well marked. When, however, certain muscles (whose tonic contraction is of some farther mechanical service to the body) are deprived of their stimulus to persistent action, secondary results ensue, which are often dangerous, and always excessively annoying. Allusion is, of course, made to the sphincters, whose tonic contraction resists the egress of their contents from those organs whose orifices they are intended to occlude. The loss of sensori-motility and reflex action induces retention of urine and fæces; but the loss of tone in the sphincters is followed by involuntary micturition and defecation. A similar condition of the palatal and faucial muscles causes stertor; of the larynx, fearful and even fatal dyspnœa. There are two classes of conditions upon which these secondary phenomena depend, convulsive action and paralysis. In the epileptic fit, if urine and fæces or semen are passed involuntarily, it is from inordinate action of the expulsor muscles; but when the ejections occur in spinal injury it is from deficient action of the sphincters. This affords an important example of the utility of arriving at a diagnosis of the "nature of affection," using those words with the meaning assigned to them in the first chapter.

g. Motility in relation to electric stimulation. I have thought it desirable to represent this as a separable element, because I do not find that its modifications take place *pari passu* with either of the foregoing, or the following. It is variable in limbs equally paralysed to volition, and bears no constant relation to tonicity, or irritability to percussion. The mode for testing it is either the volta-dynamic, or the simple galvanic current: in either method it should be of low intensity, and small in quantity; or otherwise the result is a measure of strength, and not a test of irritability, as pointed out long since by Dr. Marshall Hall.

i. Excessive electric irritability. This may be judged of absolutely or relatively in certain limbs. For example, if we know the lowest number of plates of a given battery which usually affect a healthy limb, we may compare the individual peculiarity with the average of several others; but the variations in individuals are wide; and a more satisfactory method is to compare the limbs differentially in the same person, observing always carefully the direction of the current. An excess of irritability may thus be detected in some cases. The lowest power which will affect a certain group of muscles is a better test of irritability than the difference of contraction between this group and another from the application of higher power. There appears to be an excess in some cases of cerebral paralysis, and also in some hysteric and rheumatic affections.

ii. Diminished electric-irritability may be ascertained in the same manner. It is said to occur only in cases of disease excluding the spine, and in general muscular paralysis, not that of insanity. These statements are not correct. In the present state of science, the information we possess is meagre; there is (as I can assert positively from my own experiments) by no means such consistency as various authors represent. If the electric-irritability is much diminished, and *à fortiori*, if it is absent altogether, there is reason to suspect some local affection of the nerve-trunks, or serious injury to the cord, rather than paralysis from simple cerebral causes. (The reader is referred to an article in the Medico-Chirurgical Review, for January, 1855, for some further account of the recent researches of Duchenne, Meyer, Guitard, and others, upon this subject; but a more complete resumé of the question will be shortly presented by myself, based upon a series of experimental and clinical observations.)

h. Proper motility of the muscles. Although I fully believe that contractility is the inherent property of the muscular tissues themselves, and not a faculty bestowed upon them by the nervous or any other organs, I have preferred to introduce a notice of its modifications here, rather than under the denomination of extrinsic symptoms. My first reason for this preference is the convenience of bringing all the variations of motility under one general head; and the second is, that the *modifications* which we are studying are generally the secondary results of nervous change.

This property may be examined most directly by percussion of the pectoral, brachial, and other muscles; and it may be desirable to add, that I have carefully ascertained that its modifications are in no constant relation with those of motility in dependence upon either volition, sensation, reflexion, electricity, or tone. A sharp "tap" of the skin immediately over the belly of a muscle is the easiest method of production, and we should then compare the result with that obtained by pinching the skin, or striking the skin over a bone, in order to exclude reflection. I have found, in many cases, the irritability to percussion much greater in the paralysed (to volition) than on the non-paralysed side; and this irrespective of appreciable tone (when the muscles have been relaxed or contracted; flaccid or firm), when there is precisely the reverse condition in respect of electricity; and when, at the same time, I have been unable to induce any muscular action as the reflex of irritating the skin. It has, however, yet to be shown whether or not the modifications of this property do not depend upon some changes in the nutritive condition of the muscular tissues.

i. Proper irritability in excess. There is considerable difficulty in obtaining any contraction by percussing the muscles of a perfectly healthy man in a condition of good nutrition; but when there is any emaciation it is extremely easy. Cases of phthisis exhibit excessive irritability very frequently (as every one who has examined the chest by percussion must have observed): in tubercular meningitis I have found the irritability most highly marked. In many instances of hemiplegia the difference of the two sides has been notable in the extreme, the slightest concussion of the muscles causing extensive movement of the hand and fore-arm.

ii. Diminished irritability. This is, of course, difficult to ascertain absolutely; but I have no hesitation in asserting that, considering the imperfect nutrition of many epileptics, there is less irritability to be discovered in their muscles than in those of healthy individuals. I have scarcely ever been able to produce the slightest contraction in the muscles of an epileptic, although I have endeavoured to do so repeatedly in cases presenting every variety of organic condition.

The diagnostic value of these symptoms has yet to be appreciated; but their relation, both in its negative and positive aspects, to pathology is interesting and important, and leaves us some room for hope that by the examination of objective, physical phenomena, we may perhaps ultimately reach far greater certainty in diagnosis and prognosis.

i. The simple tonicity of muscles. This, though directly dependent for its modifications upon the organic (vegetative) state of the body generally, may be, and often is, influenced indirectly by changes in the nervous system. Thus, the muscles of a paralysed limb are nourished defectively as the result of inaction; and on the other hand, the presence of long-continued spasm induces an increase both of nutrition and tone. The simplest test of tonicity is the size and firmness of the muscular tissues.

i. Excessive tonic contraction is often observed in paralysis; the contracted hand or arm evincing the increased energy of the flexor muscles. It is not simply the loss of tone on the other side, for we may find open-hand with paralysis; and very frequently it is a mere assumption that the extensors are inactive. It is commonly found, that when closed-hand exists, all the muscles are firm. Some cases of torticollis are probably examples of undue tonic contraction, rather than of anything else.

ii. Diminished tone. This is observed to its very highest degree in some cases of lead poisoning; but it is found in other varieties of paralysis. The muscles undergo degeneration (of fatty and fibroid character), and hence the property they possess in virtue of their special structure is *pro tanto* lost. The force and resistance of the arterial pulse; the colour, temperature, and hygrometric conditions of the skin afford a further means for judging of tonicity; but these are not, properly speaking, intrinsic nervous symptoms, although it remains yet to be shown upon what conditions they do essentially depend; and the progress of physiology and pathology indicates that in the organic or "sympathetic" system of nerves, and its relation to the cerebro-spinal, we are to search for the cause of such modifications if we would obtain success.

The various modifications of motility which have been enumerated are found clinically in almost every variety of combination. Some combinations are, however, much more frequent than others; for example, it is exceedingly common to find diminished voluntary power with increased reflection, &c.

This is, perhaps, the most fitting place to define the meaning of four words in more or less constant use, but of rather varied signification:—

Convulsion. This word is taken to mean the occurrence of universal, involuntary muscular contraction, generally of paroxysmal (temporary) duration. Spasm is used to denote involuntary action of less extent.

Epileptoid, or *epileptiform attacks.* These expressions are essentially bad, since the epileptic fit varies between such wide extremes. However, the terms are convenient to express the following symptoms:—Sudden loss of perception and voluntary power, with more or less generally distributed spasmodic movement; the latter being commonly quasi-tonic at first, then clonic, and appearing to impede the respiratory process: the attack lasting from two to twenty minutes, and being followed by some exhaustion and sleep.

Coma is a useful word to denote the loss of perception and volition (loss of consciousness), with appearance of profound sleep, from which, however, the patient may be partially aroused.

Carus, or profound coma, indicates an intenser form of the same condition. The patient cannot be roused: there is loss of sensation and reflection (as well as of perception and volition), commonly stertorous respiration, flaccid limbs, open eye, and dilated pupil. Between coma and carus there may be present every conceivable intermediate degree.

II. The symptoms which are extrinsic to the nervous system are those morbid phenomena which cannot be considered as modifications of the manner in which that system performs its functions. We do not yet know the precise relation subsisting between the various organic processes and the nervous centres; hence the two groups have to be considered separately.

The phenomena referred to extend through the whole range of pathology, but it is only intended to enumerate those which are of the most importance, and to do so as briefly as possible. They may be arranged thus:—

A. Symptoms referred locally to the regions of the nervous centres,—the head, spinal column, &c.

1. Changes in form, including:—
   - *a.* The condition of the bones, fontanelles, size of head, &c.
   - *b.* The integuments; eruptions, deposits, growths, &c.
2. Vascularity of region, judged of by:—
   - *a.* Appearance; the colour of face, its persistence or alternations; injection of conjunctivæ, &c.

b. Temperature; the forehead as compared with the cheeks; the head compared with the body generally.

c. Pulsation in the vessels;—carotid, temporal arteries; condition of the jugular veins, &c.

3. Pain in the head, either spontaneous or induced; pain in the spinal column; tenderness under pressure or warmth. This modification of sensibility cannot be considered under all circumstances as a change of function; it is a morbid superaddition. (See Sensibility, for further particulars.)

B. Symptoms referred, not to the nervous centres or their locality, but to some other portions of the body.

1. The system generally: *i.e.*, no one particular organ being affected more than another primarily, although secondarily certain tissues may become the locality of special disease or deposit.

a. Pyrexiæ. Almost all the "fevers" are attended with some peculiar modifications of the nervous functions, and therefore when certain concatenations of the latter present themselves, it is at once desirable to examine the body generally to discover the existence or non-existence of the former. This treatise is not the proper place to discuss the diagnosis of these affections, but the more prominent and frequent sources of difficulty arise from:—

i. The exanthemata. (Rubeola, variola, typhoid, scarlet-fever.)

ii. Gastric remittent fever.

These two groups are much more liable to be confounded with nervous affections (of primary character) in children than in adults. The sources of difficulty in the latter are more commonly:—

iii. Rheumatism.

iv. Typhoid, typhus, relapsing-fever.

b. Cachexiæ; not necessarily febrile, but general conditions of depraved vitality, exhibited in the processes of nutritive life.

i. Tubercle. The evidences of such diathesis are to be sought for in the hereditary antecedents, the lungs, the glands of the neck, and in the general symptoms of dyscrasia. It is often of the utmost importance to know certainly whether or not such a condition exists.

ii. Carcinoma. Age is an important element in the diagnosis: the general aspect and habitude of the patient must be inquired into, and evidences of deposit in external and internal organs weighed.

iii. Diabetes mellitus.

iv. Urinæmia.

The characteristics of these two conditions are to be sought for in the special changes of the urine which they induce, and in the symptoms which attend their development. These are placed among the cachexiæ rather than in the next group, because it is not until the local (kidney) affections (which may be considered the primary elements of disease) have induced general and systemic changes that we meet with any nervous phenomena which could be confounded with intrinsic disease of the nervous centres.

2. Symptoms referred to particular groups of organs:—

a. Gastro-intestinal tract; both its parenchymatous organs and mucous surface:—

- i. The teeth and gums in children.
- ii. Stomach, intestines, liver, &c.

b. Respirato-circulatory.

- i. Cardiac diseases, chronic and acute.
- ii. Lungs, pleura, bronchi.

The pulse-respiration ratio: the characters of each element: aeration of the blood: the existence of cough, expectoration, &c.

c. Genito-urinary system.

- i. Kidneys, bladder, &c. for calculoid affections, the retention of secreted urine, &c.
- ii. Uterus, testes, ovaria, &c., including the conditions of menstruation, seminal emission, priapism, &c.

All these symptoms taken together, their varied relationships to extent, intensity, and time, form the means of diagnosis in those cases where diagnosis is possible. It is from their course and order of development, taken in conjunction with the proportion they bear to each other, rather than from the existence of any special class deserving the name "pathognomonic," that diagnosis is established. Of this, the most abundant proof is given in the chapters which follow; having for their object the differentiation of diseases presenting generic similitude of symptoms, and consequently forming groups whose broader features of distinction from one another may be readily and at once appreciated.

CHAPTER III.

ON THE CLASSIFICATION ADOPTED.

THE arrangement employed in the following chapters needs some comment, as it is not based upon the principles usually adopted in treating of the diseases of the nervous system, or of any other group of organs.

It would be possible to construct a classification upon a purely dynamic basis, adopting such order in disposing of the subjects as is given in the preceding chapter upon symptoms; and this plan would be the right one to make use of if a treatise upon pathology were in contemplation. We should have, then, to consider the nature of every modification of function *per se*, and its bearings upon the others; the object being to describe the natural history of every function in every morbid condition. For the purpose of diagnosis this would be cumbersome; many diseases which have a distinct anatomical relationship would be distributed over various groups of semeiologic formation, and the derangements as they occur clinically would be altogether out of keeping with the system.

On the other hand, it would be comparatively easy to construct a classification of anatomical conditions; and if the purpose of this treatise were to describe the pathological anatomy of the brain, spinal cord, and their appendages, this system of classification would be the correct one to adopt. But its purpose being very different, such system would prove utterly inapplicable, as it would leave out of view many diseases, presenting most marked phenomena during life, and would confound together in generic groups diseases which run different courses, and require very dissimilar modes of treatment.

It is not at all intended that classifications thus formed, if formed correctly, may never be useful or successful; but in the present state of medical science it is impossible so to frame them that when brought together they shall form parallel lines. Instead of mutually explaining each other, they inevitably confuse, and leave the subject involved in deeper mystery than it was before the attempt was made.

The occurrence of similar symptoms from (or with) anatomically different diseases, and the presentation of dissimilar symptoms by diseases (so far as we can ascertain) identical in their anatomy, are matters of daily observation; and this double discrepancy shows (as it has been already stated) not that there is an entire absence of relation between the two classes of phenomena, but that we are far from having appreciated the nature of that relation. The true point of contact may be undiscoverable in many instances; in others we may, by future investigation, be led to its detection. One illustration will suffice to show that we must not be over sanguine with regard to this discovery. If the nerve supplying some group of muscles is laid bare, and in consequence of something done to that nerve contraction of the muscles follows, the muscular contraction is the symptom, and, supposing all but the muscles to be concealed, the objects to be diagnosticated are the locality of lesion, the nature of the symptom, and the static conditions upon which it depends. Strong probability with regard to locality might be arrived at from noticing the particular muscle or muscles affected: the nature of the affection might be at once stated as an increase of motility in obedience to some abnormal excitation: but the

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physical causes of irritation may be various, and it would be impossible, judging only from the symptom, to determine whether it was simple pinching of the nerve, the application of a heated wire, of chemical, or galvanic stimulus. It may be that by repeated observations some differences should present themselves in the course of an extended series of such irritations, so that from their consideration the nature of the stimulus might be ascertained; but the symptom itself gives not the faintest outline of such distinction, and it is very much the same with regard to more complicated cases, the difficulties being increased in proportion to the number of nervous elements involved.

With regard to some diseases, we appear to have arrived at what in the present state of science we must reluctantly term "ultimate facts," such as the "exalted readiness" of involuntary (reflex) motility in epilepsy and hysteria; the condition of "exhaustion" to be found after great excesses; the double, but apparently opposite, action of certain blood-conditions upon the brain and spinal cord, &c. &c. It is important to leave as small a number of these unreduced fractions of the truth as possible, but there are some which we must consider to be such, and use as such, at all events for a time, in order to advance.

The object of this treatise being neither pathology nor anatomy, but the discrimination when possible of their point of contact, and the recognition of its impossibility when such impossibility exists, a classification, based upon clinical grounds, is adopted, as it appears to my own mind to be the most consistent with the two classes of terms to be brought together, and because, farther, it is the most readily applicable, avoiding one of the difficulties which beset the employment of works on diagnosis, that of having to find out what the disease is before being able to turn to the proper part of a book for information on the subject.

The basis of classification which I am about to propose and adopt is formed by the three objects of diagnosis;—locality, nature, and lesion. In some cases the primary lines of division are in accordance with one, and in some cases with another, the object being to form clinical groups which may be readily recognised, rather than those which shall be open to no criticism on the score of system. Thus, although the distinction ot intrinsic and extrinsic diseases is one of primary importance, and so much so that I have given separate consideration to it in an early chapter, it is left to form a tertiary basis of division in other instances, as for example in the apoplectic class. The general lines of arrangement are the following: groups are formed by,—first, the locality or organ affected; secondly, the nature of its affection; and thirdly, the anatomical conditions which underlie them. In this place only the headings, or those large groups, are mentioned whose consideration will form the topics of distinct chapters. At the commencement of each of the latter a fuller list is given of the various anatomical conditions which may occasion the phenomena of the group.

I. Diseases of the encephalon.
A. Acute.
1. Febrile, or inflammatory. Chap. VI.
2. Non-febrile.
a. Apoplectic diseases. Chap. VII.
b. Diseases marked by delirium. Chap. VIII.
c. Convulsive diseases. Chap. IX.
d. Diseases marked by pain. Chap. X.
B. Chronic diseases.
1. Marked by increased activity. Chap. XII.
a. Ideation, its characteristic being hallucination, &c.
b. Sensation, ,, ,, pain.
c. Motility, ,, ,, spasm.
2. Marked by diminished activity. Chap. XIII.
3. Marked by the combination of increased and diminished activity. Chap. XIV.

II. Diseases of the spinal column and cord.
A. Acute. Chap. XVII.
B. Chronic. Chap. XVIII.

III. Diseases of the nerves. Chap. XX.
  - **A. Structural, or organic.**
    - **1. Neuritis.**
    - **2. Tumor.**
  - **B. Functional, or dynamic.**
    - **1. Neuralgia, and spasm.**
    - **2. Anæsthesia, and paralysis.**

CHAPTER IV.

ON THE DIAGNOSIS OF LOCALITY GENERALLY.

It is the object of this chapter to point out the general grounds upon which some diagnoses of locality are based. This is, as already stated, the first problem to be solved; and although, in its minuter details, many points will be left for consideration in the chapters devoted to particular groups of disease, it is desirable that some of the broader lines of distinction should be defined at the outset. These are, the distinction of diseases of the nervous system itself from the nervous complications of other diseases; the diagnosis of affections of the brain, spinal cord, and nerves from one another; and the separation of meningeal from central lesions.

I. The diagnosis of extrinsic and intrinsic diseases.

In the consideration of a large number of cases (for example, of convulsions in childhood; of febrile conditions, with marked delirium, &c., in the adult; of some apoplectic seizures, &c. &c.) the first object to be sought for is the discovery or exclusion of extrinsic conditions to which all the symptoms may be referred. These conditions are numerous, but by far the larger number belong to the category of blood-diseases (cachæmiæ). Sometimes, morbid blood-conditions are demonstrably present, but they do not account for all the symptoms; and we have then to determine for what portion they do account, *i.e.*, what is the amount of modification they induce in the course of idiopathic disease. The difficulty is often very great, as these inter-relations of disease have been only superficially noticed.

The particular change which the blood undergoes in many cachæmiæ is entirely, or almost entirely, unknown to us; some physical, chemical, and vital changes in other diseased conditions we have recognised; but in each group we have made out more or less distinctly some of the vital (dynamic) and physical (static) effects of such cachæmic conditions, and by these we must establish their diagnosis when other means may fail.

The conditions to be sought for have already been mentioned in Chapter II., under the denomination of extrinsic symptoms. (See p. 45.) It is the intention of the present chapter to point out the grounds for their separation from centric (nervous) diseases generally, and not to enter upon the diagnosis of each eccentric condition. We may infer the existence of extrinsic disease, from—

1. The nature of the prodromata (or the precursory symptoms), which have been of a kind not referrible to primary disease of the nervous system.

2. The presence of physical signs and symptoms over and above those for which the nervous conditions will account; and

3. The general course and proportion (to each other) of the existing symptoms (both intrinsic and extrinsic).

First. The prodromata. In extrinsic disease, these may be slight in degree, and variable in kind, and it is possible that peculiar phenomena of nervous derangement may occur without their previous detection. Thus, cases of Bright's disease of the kidney have been undiscovered until serious nervous symptoms have indicated suddenly how far and how insidiously disorganisation had been at work.

Generally, however, the prodromata have existed in a distinctive form; and they may have been referrible to the whole body, as, for example, the malaise, anorexia, oppressive headache, vomiting (see p. 56), &c., of impending fevers, or they may have been local, as, for instance, œdematous ancles, renal pain, albuminuria, or saccharine diabetes.

The prodromata which exist in primary nervous disease are, for the most part, modifications of the proper nervous functions, either changes in the mental or emotional disposition of the patient, or some phenomena of deranged motility or sensibility. Thus, the precursory symptoms of centric disease belong to the category of intrinsic symptoms; those of disease elsewhere to that of extrinsic symptoms. This is not, however, assumed or stated to be universally the case, but that it is so very generally is not open to doubt: it is so with sufficient frequency and constancy to render the consideration of importance in respect of diagnosis. (For further details, see chapters on febrile, apoplectic, and convulsive diseases.)

SECONDLY. Symptoms over and above those for which any nervous lesion will account. Among these we recognise at once the following:—Œdema of the ankles, albuminuria, mellituria, casts of tubes in the urine, swellings of the joints, organic affections of the heart, icteric condition of the skin, exanthemata, and peculiar eruptions of specific febrile diseases, irritation of the gums from unprotruded teeth, diarrhœa, &c. &c. It would be vain to attempt an enumeration of all these phenomena, but they are to be sought for if not at once discoverable, as some may exist to a slight degree only, and elude observation if not specially directed to their detection. Besides these distinctly morbid phenomena, it is important that we should take into account the conditions (more or less normal in their character) which are peculiar to different ages, sexes, temperaments, and individuals. The tendencies of dentition, menstruation, pregnancy, the climacteric period, and decrepitude, must be weighed in order to ascertain how far they may account for the phenomena presented by a particular case. Again, it is of importance to know the standard of habitual health (mental and corporeal) in order fairly to estimate the kind and amount of variation.

THIRDLY. The course and proportion of existing symptoms. In the several chapters on special diseases it will be seen that from the relative intensity of two symptoms, more than from their actual co-existence, certain differential diagnoses are established. For example, the discrimination of apoplectic hæmorrhage, from softening in an apoplectic form, may frequently turn upon a consideration of this kind: and the separation of typhoid fever with cerebral complication from meningitis with fever of a low type, may be arrived at by the difference of proportion which exists in the two classes of disease between the elements (symptoms) which each presents in common with the other. In the case of intrinsic disease with general complication, there is an absence of the direct proportion which usually exists in extrinsic diseases between the intensity of the general disturbance and that of the motorial, sensorial, and mental functions. Exceptional cases occur; but, as a rule, the nervous system in general disease participates only and equally with the body at large. In the case of intrinsic disease the nervous system has its own functions primarily and prominently affected, and to a degree for which the systemic derangement will not account.

The order of development usually differs: in intrinsic diseases nervous symptoms are the earliest to appear; in extrinsic diseases they are secondary in relation to time. This (as is stated already) does not always hold good; but it is generally true, and as such is worthy of consideration.

Contrasting these two great classes of disease, we may infer when—

1. Prodromata are of intrinsic character, or absent;
2. Signs of distinct general disease are undiscoverable;
3. The intrinsic symptoms precede such general or extrinsic symptoms as may be present, and are of greater relative intensity than any which the latter will account for—

. . . that the disease in question is intrinsic, or that the nervous system is primarily and principally effected.

When, on the other hand—

1. The prodromata are highly marked, and consist of extrinsic symptoms;
2. The signs of general (or extraneous) disease are discoverable;

3. The extrinsic symptoms have not only preceded the intrinsic, but the latter bear a definite and direct proportion to the former; and the extrinsic derangements are more highly marked than those which the supposed nervous conditions could induce — . . . we infer that the disease is primarily and principally extrinsic, and that the nervous symptoms are among its many and varied phenomena.

The diagnostic value of vomiting requires some special comment. The chapter on symptoms (Elements for Diagnosis) could not present the two characters of vomiting in sufficiently distinct antithesis to render their insertion in its pages of much service; and, as the diagnostic value of the symptom is in relation to the separation of extrinsic from intrinsic diseases generally, the present appears to me the most appropriate time and place for its consideration.

The "intimate sympathy" subsisting between the stomach and the head is a matter of daily observation. Head-ache from gastric disturbance is as common as vomiting from cerebral derangement. In children especially the existence of obstinate vomiting is indicative of head rather than of stomach disease. A consideration of the following points may lead to the discrimination of its causes:—

In gastric or hepatic vomiting there is nausea which is relieved, at all events temporarily, by the discharge.

In cerebral vomiting there is little or no nausea, and the vomiting continues in spite of the complete discharge of its contents by the stomach, so soon as anything (liquid or solid) is introduced.

In the former the tongue is foul, the conjunctiva often yellowish, and the head-ache secondary in respect of time.

In the latter the tongue may be clean, the conjuctiva colourless or injected, and the head-ache primary.

The former is frequently attended with griping pain in the abdomen, diarrhœa, and disordered evacuations.

The latter is accompanied by obstinate constipation.

In the former there is retching and increased salivation.

In the latter the stomach is emptied almost without effort, and without any increase of the salivary secretion.

Thus, vomiting is in one case an extrinsic symptom, dependent upon derangement in the gastro-intestinal canal; in another case it is an intrinsic symptom, depending upon an increased sensori or reflective motility; and, duly considered in this twofold relationship, its character (as an extrinsic or intrinsic symptom) affords much assistance in the discrimination of centric from eccentric disease, whether it is found among the prodromata or existing phenomena of a given case.

II. The diagnosis of diseases of the brain, spinal cord, and nerves from each other.

Some of the symptoms which result from disease of one nervous centre may arise from lesion affecting another. Paralysis of motion in respect of volition may (for example) depend upon a morbid condition of either the brain, the cord, or the nerves. Without entrenching upon the subject-matter of those chapters devoted to special groups of disease, it is the object of this section to state generally the means by which affections of these three primary divisions of the nervous system may be clinically separated.

The general grounds upon which diagnosis of disease in other organs is based are partially applicable to the group of nervous derangements, and partially inapplicable. Modifications in the processes of thought, and in the conditions of perception, are referred at once to direct or indirect interference with the functions of the brain; but the absence of such phenomena (when motor paralysis exists, for instance) does not exclude the brain from the attribution of disease. Thus, while on the one hand the actual disturbance of its special function indicates that a certain portion of the nervous system is the locality of disease; on the other hand, the absence of such special derangement by no means proves the reverse. As it is well understood that, in the case of motility in relation to volition, it is necessary, for the passing over of a volitional impulse to the contracting muscle, that each portion of the nervous system engaged in this transference should be intact, so it is equally obvious that the two extremes (volition and motion) may be severed by lesion of any part (*i. e.*, either nerve-trunk, cord, or brain) which lies between them; and thus the simple fact of paralysis (to volition) gives no indication with regard to the locality of disease. The same is true with regard to sensation as a whole.

Thus, one common ground of diagnosis (in respect of other diseases) is removed to a certain extent, since the complete performance of many important nervous functions is the combined product of its three great divisions. These special considerations are, however, of some value; and, taken in conjunction with the distribution and combination of symptoms, enable us generally to arrive at a diagnosis. Attention is directed to—

First. The special functions involved. We infer—

A. That the brain is the seat of disease when there is a positive change in the processes of volition, ideation, emotion, and the perception of sensorial impressions—*i. e.*, when that class of functions is disturbed whose special consideration formed Section I., A., 1, 2, 3, in the chapter on "Elements for Diagnosis" (see p. 14 and seq.), and when certain extrinsic symptoms (see p. 45) are referred locally to the head; and when emotion yet preserves its relation to motility.

B. That the spinal cord is the organ affected when, no signs of brain disease being present, perception, volition (phenomenally sensation, and voluntary movement), and often emotion are cut off more or less completely from some portion or portions of the body: these portions yet preserving their motile relationship to the cord, as exhibited by reflex and tonic spasm, by associated movements, and electric irritability; and when the extrinsic symptoms are referred locally to the spinal region. Further, the occurrence of spasm and convulsion, especially of tonic character, and of all abnormal involuntary movements in excess, indicates a probability of spinal rather than of cerebral injury.

C. That the nerve-trunks are originally affected when there are signs of local injury in their course, when the special functions of particular nerves are alone involved; the brain and spinal cord presenting no positive change in their actions; and, if motility and sensibility are lost, when the loss is complete, no reflex actions, and no electric irritability remaining.

Although considerations of this kind may, under certain circumstances, lead to a diagnosis of locality, there is always some uncertainty from the unsatisfactory manner in which negative evidence is interpreted. Disease of the brain (for instance) need not affect volition or ideation, and disease of the cord may present the features of "nervous" disease. There are, further, many complicated cases in which positive evidences of disease in the medulla spinalis are found in conjunction with the negative signs of cerebral affection; for example, hemiplegia with exalted reflex activity: and there are two modes in which this relation may be explained—(*a*) that the simple fact of removed or diminished cerebral power exaggerates, *per se*, the activity of the spinal cord; and (*b*) that the reflex phenomena are due to a morbid spinal condition, not necessarily associated with the cerebral, but in particular cases developed either cotaneously or subsequently to the lesion of the brain. The first explanation rests upon, and is at the same time taken to prove the supposition of an antagonism between these two nervous centres ; an antagonism which, if not entirely imaginary, is at all events very incorrectly stated (see Appendix C.) : and the second mode of explanation appears therefore to be that which we are alone warranted in adopting. We shall have, then, to consider some diseases which have been referred exclusively to the brain, as dependent upon some primary lesion of that centre, plus an induced, it may be dynamic, condition of the cord.

We come now to consider the second mode by which this diagnosis (of brain, spinal cord, and nerves from each other) may be established.

Secondly. The distribution of symptoms (their locality, extent and limits). The assistance derived from these considerations is based upon the tendency of our mind, a tendency of which experience confirms the truthfulness and utility, to refer a similar modification of dissimilar organs, not to the simultaneous change of both organs, but to a change in something which is common to the two. And again, we are disposed to assign the smallest possible change which can produce the effect as the sufficient cause of the symptoms presented. Thus, in a case of perfect hemiplegia, we, in accordance with the first tendency or law, refer the symptoms to some part of the organism common to all the nerves of sensation and motion on one side (the cerebrum), rather than to the nerves and muscles themselves; and in a case of local paralysis, in accordance with the second disposition or rule, we refer the symptoms to some lesion of the nearest nerve-trunk which is common to all the muscles involved.

By careful examination the exact seat of injury may sometimes be discovered, especially in spinal diseases, although these limitations are always liable to error. However, we conclude,—

A. That the brain is the seat of lesion when several of the special senses are simultaneously affected; when the muscles and general sensory nerves are implicated longitudinally and unilaterally (hemiplegia); when muscles situated so high as those of the face and tongue are involved, and the orbicularis of the eyelids does not share in their affection. In those rare cases of bilateral (or transverse) paralysis (paraplegia) resulting from some cerebral change, the symptoms at some period of the case have generally referred to the head (by their special character), so that by a combination of the two classes of observations, the diagnosis may be almost universally established.

B. That the spinal cord is the organ affected when the symptoms of motor and sensory character are distributed transversely or bilaterally, inducing paraplegia or transverse spasm. The precise locality may be estimated sometimes from the anatomy of the spinal nerves. If the lesion or disease is high, speech, deglutition, respiration, &c., are impaired. There is often erection of the penis, the retention or involuntary discharge of fæces, and urine according to the conditions already described (see p. 39, and Chaps. XV. and XVI.).

C. That the nerve-trunks are the seat of lesion when the symptoms are referrible to an isolated muscle or group of muscles, or to a small portion of the sensory surface. When paralysis is the symptom, the irritability of the muscles to electric stimulation is quickly lost; and the symptoms show no disposition to wander from the special localities affected.

The means of distinction may be resumed thus :—

1. When perception, ideation, volition, and special sensation are affected; and motor and general sensory changes exhibit a unilateral distribution, the brain is commonly the seat of disease.

2. When the mental functions are unchanged, and motility and general sensibility are affected bilaterally, we infer the spinal cord to be the locality of lesion.

3. When the relations between motility, volition, and reflexion are lost, the mental functions being unchanged, and when the motor and sensory disturbances are purely local, we refer the disease to some of the nervous trunks. In each case the extrinsic symptoms are referrible to the special locality or region affected.

III. The diagnosis of disease in the nervous centres themselves from disease of their meninges.

We do not know that the meninges have any dynamic functions to perform: their properties and uses appear to be physical only, serving as the media for vascular supply and for protection from shock. The symptoms which their morbid conditions present resolve themselves into modifications of the nervous properties; they are, in fact, due to changes in the contiguous central organs; intrinsic symptoms, or modifications of the manner in which the latter perform their actions. The peculiar character of the change which meningeal affections induce is sometimes sufficiently marked to distinguish them from central disease : often the two elements co-exist, and we are able to arrive at approximative certainty only with regard to the part which each plays.

Leaving aside (for the consideration of subsequent chapters) the differences between individual diseases, and taking a general view of the whole range, we may, I think, advance the following distinction:—

A. Centric diseases are marked from the outset, or at all events from an early stage of their development, by the loss of some one or more of the proper nervous functions, such as paralysis, anæsthesia, loss of memory, &c.

Further, they are not commonly attended by highly marked exaggeration of function (such as furious delirium, convulsions, intense hyperæsthesia, &c.), or by the epiphenomena of pain, tenderness, &c.

Centric diseases exhibit commonly little vascular excitement, or any of the group of extrinsic symptoms referred locally to the affected region ; nor is there frequently any highly marked general disturbance.

B. Meningeal diseases are not characterised, except after some time, by the diminution or loss of function; and such losses are almost invariably preceded by,

Extremely severe excitement or exaggeration of function, such as furious delirium, dysæsthesia, convulsions; and by well marked epiphenomena, pain, tenderness, &c.

In meningeal affections there is commonly much local vascular excitement, with general disturbance.

The paralyses and anæsthesiæ, losses of volition, ideation, perception, &c., characterise cerebral: spasms, convulsions, pain, and delirium, are the features of meningeal disease. The two classes of symptoms are very commonly combined, inasmuch as their organic conditions are frequently combined; but we may separate the preponderating elements in individual cases, and the mode of doing so will be found more fully elucidated in the chapters which follow. (See Chapter VI. for Cerebral Meningitis; and Chapter XVII. for Spinal Meningitis.)

PART II.—DISEASES OF THE BRAIN.

CHAPTER V.

THE DIAGNOSIS OF BRAIN DISEASES AS TO THEIR GENERAL NATURE.

BEFORE proceeding to the discrimination of particular diseases from each other, it is desirable to state the means by which we may diagnosticate the several clinical groups, which are formed for us by nature, and which have been placed as the limits of division, based simply upon symptomatic characters, in the chapter upon Classification (p. 51).

The diseases which fall under these headings are not all of them primarily intrinsic; but the symptoms they present being essentially brain symptoms, they are brought into this category for the sake of convenience. It is unnecessary to add anything further upon the separation of acute and chronic diseases. The distinction is one readily appreciated and applied; and such remarks as appeared to me necessary to make have been already placed in the chapter referred to.

We have, under the former division, the acute, to recognise four groups, the febrile, apoplectic, delirious, and convulsive: under the latter, the chronic, to distinguish three, viz., those marked by excessive activity of some functions; those characterised by diminution, and those presenting, in combination, the features of the latter two.

I. FEBRILE. The diagnosis of these diseases turns mainly upon,—

A. Extrinsic symptoms—viz., the presence of general signs of fever, such as heat of skin, thirst, anorexia, frequent pulse, disordered secretions, general oppression, and disturbance, with head-ache, pain in the limbs, and sensorial discomfort.

B. The intrinsic symptoms are of various kinds, frequently passing through two or more successive stages, marked by the following characters (a. and b.)

1. Intellectual. *a.* Delirium of various kinds, and commencing at different periods; wandering thought, or furious excitement; to be followed by,—

b. Loss of perception and volition; coma, with no sign of persistent ideation or emotion.

2. Motorial. *a.* Spasmodic action, affecting particular groups of muscles, and producing every variety of contraction, from twitching of the smaller limbs to violent general convulsions. The axes of the eyes are distorted, and strabismus occurs, with subsultus tendinum, carphology, &c. These phenomena are commonly followed by,—

b. Paralysis, more or less generally distributed, the paralysis sometimes co-existing, at other times alternating, with spasm.

3. Sensorial. *a.* Dysæsthesia, marked by intolerance of light and sound, or of any sensorial impression: violent pain in the head and often in the limbs, succeeded by,—*b.* Anæsthesia, and apparent loss of general sensibility.

II. APOPLECTIC DISEASES. Although the word apoplexy in its correct etymological meaning refers to the particular organic or static condition of extravasation, it is so commonly employed without any intention thus to limit its meaning, that it is retained in this treatise and used in its widest sense—*i. e.*, it is employed to characterise a certain group of symptoms irrespectively of the anatomic conditions upon which they may depend.

The symptoms thus included are familiar to every one; after a period of varying duration (from a few seconds to weeks, months, or years), marked by sundry derangements of the nervous functions (such as loss of memory, dulness of sensation, or diminished power), the individual is more or less suddenly deprived of perception and effective volition: he falls to the ground insensible, or may only stagger and cling to some object for support: the respiration and circulation may be unaffected, or the former may be stertorous, and the latter laboured: some group of muscles, a side of the body, or the whole body is paralysed, flaccid, and motionless; or on the other hand, rigid with tonic, or convulsed by clonic spasm. In this state the patient may die; or from it, he may recover partially or entirely; in the former case leaving some mental, motorial, or sensorial faculty impaired, for weeks, or for the whole of after life.

The diagnostic symptoms are, the sudden loss of perception and volition in their relation to sensation and motility; or, in more common but less distinctive terms, the loss of consciousness, with paralysis. The degree or intensity of the affection varies widely, from slight obscuration of intellect, with embarrassment of a particular group of muscles, to the most complete abstraction of all apparent consciousness and power of movement. The same organic change, for example, hæmorrhage, may cause the former degree, or the latter. In extent, also, the symptoms vary within no less widely separated limits; one or two muscles may be affected, or memory may be lost for certain classes of ideas; and, on the other hand, the whole muscular system may be paralysed, and no trace of mental action be discernible.

This sudden loss of function takes place (as a second characteristic) without febrile excitement at the time; it may occur subsequently, and is then probably due to secondary changes, in the same manner that spasm and rigidity of the muscles occur. The essential nature of apoplexy is the occurrence of some static or dynamic change which, *pro tanto*, severs volition and perception (the brain functions) from motion and sensation: the other symptoms that occur, spasm, hyperæsthesiæ, &c., are additional phenomena, often depending upon induced secondary conditions of the parts which are primarily the seat of lesion. They are useful in the diagnosis of individual diseases, as will appear hereafter.

III. DISEASES MARKED BY DELIRIUM. Although delirium occurs in the febrile, and also in the apoplectic diseases, it does not constitute their main feature. As a simple occurrence it is of little diagnostic value; but of some morbid conditions it forms, for a time at least, the most prominent symptom; and around it others are grouped, which constitute a class of great interest and of no less obscurity.

The simple fact of delirium is the expression of ideas erroneous in their relation, either to each other or to sensation. If such a condition existed with loss of motility (affecting speech and gesticulation), there would be great difficulty in ascertaining its existence: we do not know, therefore, the exact nature of distinction between coma and delirium. There are two degrees of delirium to be separated—viz, that of volition, and of idea; the former is usually violent and maniacal, the latter quiet and inoffensive. The class of diseases to be recognised under this head have as their characteristics,—

1. Delirium, or erroneous ideation, as the prominent symptom, and—

2. The absence of fever. It is very important that this should be borne in mind, in order to exclude the febrile affections.

IV. DISEASES MARKED BY CONVULSION. This group is intended to include those cases of which convulsions form the only or the prominent feature. The conditions upon which such symptoms may depend are extremely various, but there is some attempt at their reduction given in Chapter IX. Although some of the anatomical changes which induce convulsions are to be found also underlying delirium and apoplexy, and although we are unable to assert upon what quality the difference of symptoms may depend; yet we cannot fail to recognise the importance of the difference, and to believe rather in the existence of some static discrepancies which may hitherto have escaped our notice, than in the identity and equality of the diseases whose phenomena during life have presented such vast dissimilarity. Although, therefore, it will be found that softening of the brain (for example) occurs in the apoplectic, delirious, convulsive, and quasi-febrile form, I prefer considering that peculiar condition of the brain in conjunction with its several groups of symptoms as representing four different conditions of disease, rather than looking upon them as variable phenomenal phases of the same malady. A disease is not to be made out by either its symptoms alone, or its anatomy alone, but by a conjunction of the two; and, with this principle in mind, we are justified in separating the phenomenal forms of disease into distinct groups, until it can be shown upon what the differences between these forms depend. It is probable that convulsions, from whatever remote cause they may derive their origin, depend directly, in exact proportion to the similarity existing between them in different cases, upon the same conditions. We may often obscure the progress of science as much by drawing artificial lines, as by failing to observe those which are laid down by nature. The names epileptic, hysteric, centric, sympathetic, &c. &c., do not create a difference, except in our own minds, and that certainly a fallacious one until it is shown wherein the distinction lies. Phenomena which are identical should be considered to be so, although they may be separated widely by nosologists; and that which is held to be the immediate cause of convulsion in one case should be held to be its cause in another, although there may be ulterior phenomena of various kinds which influence and direct us in judging of the disease as a whole. The diagnosis of these ulterior conditions is the object we have in view; and although the nature of the convulsive phenomena themselves may sometimes aid us in its establishment, much more frequently the diagnosis turns upon secondary considerations—*i.e.*, those not immediately forming a part of, nor dependent upon, the attacks themselves.

The term convulsion has already been defined: its characters are unfortunately too well known to need farther comment, than to repeat that its essential features are the loss of volition and perception, with violent (partial or general) involuntary spasm; occurring paroxysmally, and presenting embarrassment of respiration and circulation, often followed by stupor and stertor.

The *chronic diseases*, marked by derangement of the cerebral functions, are divisible into three groups, whose general features are sufficiently distinctive to render the diagnosis so far (*i.e.*, into those groups) comparatively easy. (See Chap. III., p. 51.

I. DISEASES MARKED BY THE EXALTATION OF FUNCTION.

These are extremely common and widely various, including all those chronic affections which are characterised by augmented ideation, sensibility, and motility. Some diseases present the perfect isolation of a particular nervous function—*i.e.*, in its morbid relationships; others are marked by the combination of derangements. We may readily recognise in many cases the distinct predominance of a particular element of disease, such as hyperæsthesia, or hypercinesis; in other cases, so many of the properties of nervous action appear diseased, that we can give some name to the combination, but find it very difficult to appreciate its true nature.

The diseases which will come under consideration in this group (see Chap. XII.), may be recognised by the following characters :—

1. Chronicity, often carried to its extreme, and hence their,—

2. Little danger, in respect of life.

3. Irregular course of development, the symptoms being often paroxysmal, or occasional only.

4. Special functional derangements, which may be grouped thus:—

A. Hyper-ideation, of a morbid and quasi-melancholy character. The patient is "possessed" by ideas for whose origin he can give no account, but whose power is manifested in the course and direction of his mental life, and often reveals itself in the sphere of nutrition, inducing secondary changes. These ideas relate commonly to personal health and capacity, rarely (if ever, *per se*) involving life in its social relations, except as a secondary result. Hypochondriasis affords the typical example of this condition.

B. Hyperæsthesia, or the presence of abnormal sensibility of an exalted kind. Pain is the common phenomenon, for example, in hemicrania; morbid sensations, not necessarily painful, are the features recognised under the head of hallucinations, and vertigo of sensation.

C. Hypercinesis, or exaggerated motility. The phenomena of this class are various forms of muscular spasm—*e. g.*, chorea, paralysis agitans, &c.

The diseases which come under this denomination form a group which has well-marked features, and which are commonly dynamic in their origin, so far as we can ascertain in the present state of medical science.

II. DISEASES MARKED BY THE DECREASE OF FUNCTIONAL ACTIVITY.

The most common affection presenting simple decrease is that peculiar form of disease known as anæsthesia muscularis. It is thought desirable merely to mention this morbid condition here, and to refer the reader to Chap. XIII., for its special characteristics.

III. DISEASES MARKED BY EXCESS OF SOME FUNCTIONS, AND DIMINUTION OF OTHERS.

We have here a large and highly-important group of chronic diseases. They may be diagnosticated from all others by—

1. Their chronicity.

2. Their irregular, but in the main progressive, development.

3. Their special nervous characters, resolving themselves into various combinations of the following kind:—

A. Hyper-ideation, with acinesis. The common features being delirium, occasionally presenting at night, and of mild character; or simply irritability of temper and restlessness, with slowly and imperfectly developed paralysis, or simple loss of power.

B. Hyperæsthesia, with acinesis. Thus we meet with pain in the head, and intolerance of sensorial impressions, in conjunction with paralysis.

C. Hypercinesis, with anæsthesia. The combination of more or less spasm, with loss of sight, or hearing, for example.

Every variety of combination may exist; such as convulsions, with slowly diminishing intellect; pain, accompanied by spasmodic movements ; delirium, with convulsions, &c. &c. (See Chap. XIV.) The changes of function are commonly but not invariably persistent in some: they are endlessly variable in others. The group is one of great importance and interest, not merely from the difficulties of diagnosis which it presents —difficulties which I shall not anticipate by their statement here—but from the evidently beneficial results which may follow well-directed treatment in some, and from the utter hopelessness of others: a difference which, perhaps, more than any other, indicates the value of their successful discrimination.

CHAPTER VI.

THE DIFFERENTIAL DIAGNOSIS OF ACUTE FEBRILE DISEASES AFFECTING THE BRAIN.

The general characters of these diseases have been already stated: they may be more or less readily confounded with each other, as they present similar symptoms, and a similar general disposition. However, careful examination may lead to a diagnosis of the following affections, although some of them present aberrant forms, with regard to which there may be considerable difficulty.

The first five present the greatest amount of difficulty: the last three may ordinarily be separated without much labour.

I. Meningitis, or inflammation of the pia mater, distinguishing—
  A. Simple—*i.e.*, non-diathetic, or primary, when affecting—
    1. The convexity of the hemispheres.
    2. The base of the brain.
  B. Tuberculous, accompanying deposit in the pia mater.
  C. Rheumatic, or meningeal rheumatism.
II. Inflammation of the dura mater.

III. Cerebritis, commonly meningo-cerebritis.

  A. General, and then always meningo-cerebritis.

  B. Partial, or limited (red softening).

IV. Continued fever (typhoid and typhus) with cerebral complication.

~~V. Gastric remittent fever of children.~~

V~~I.~~ Simple hyperæmia, or "determination of blood."

VI~~I.~~ Delirium tremens, in its febrile form.

VII~~I.~~ Mania, with marked febrile symptoms.

These different diseases will be now considered seriatim, in respect of those symptoms which present diagnostic value.

§ I. Meningitis.

The symptoms of this affection differ widely, both in their intrinsic and extrinsic characters, when meningitis is, on the one hand, simple, or, on the other, connected with some diathetic condition. The phenomena of

A. Simple Meningitis will be described first; and that form of disease will be taken as the type in which—

1. *The convexity of the hemispheres is affected generally.* This disease ordinarily passes through two or three stages, characterised by different symptoms; and whether these phenomena may or may not be rightly interpreted in their relation to pathological anatomy, they are sufficiently marked, clinically, to require a separate notice. Sometimes one, and sometimes the other, may be absent, but I have seen cases passing through the three, and presenting, at each period, symptoms so definite and distinctive that they would have satisfied the most "systematic author."

a. Prodromata. The most important facts to be ascertained are those relating to the previous health of the individual, considered generally—viz., the absence of any signs of a cachectic condition, such as the tuberculous, rheumatic, or syphilitic; and the presence of any occasional causes of local disturbance, such as a blow upon the head, exposure to the sun, disease of the ear or nose, intense application to study, or to the cares of business. Actual morbid prodromata may be trifling, or absent altogether; the most common are, slight but increasing pains of the head, sensorial disturbance, and irritability of temper, or restlessness, with some general malaise.

b. First stage commences with a combination of extrinsic and intrinsic symptoms.

i. Extrinsic symptoms. Rigor, or simple chilliness, with cutis anserrina, and pallor of surface, quickly followed by febrile reaction. The rigor may be supplanted by an attack of convulsion, and this occurs most frequently in children. It is by no means common in the adult, and must be considered as taking the place of the initial shivering, and not as indicative (from its simple presence) of very severe or advanced lesion. The fever is commonly high; the pulse sharp, hard, and frequent; respirations irregular, suspirious, and often moaning; skin is hot; the bowels obstinately constipated; the evacuations, when occurring, are dark and offensive. There is, in this stage, little or no prostration of strength. The headach of fever is supplanted by acute, intense pain; the face flushes and turns pale alternately; the eyeballs are staring, and conjunctivæ injected.

ii. Intrinsic symptoms may be referred to three groups—

a. Mental. The temper is extremely irritable; there is marked somnolence, or wakefulness, and the two sometimes alternate for several days. The most marked feature is delirium, commencing early, and of furious character; the patient screams and gesticulates in the wildest manner; the expression of countenance is savage and malignant, or sometimes has the fierce aspect of the brute.

β. Sensorial. Marked, continuous cephalalgia, with exacerbations of darting, violent character, eliciting from the patient, and especially from children, a sharp piercing cry. Pain is increased by movement, and hence the patient holds the head with his hands. It is increased by sensorial impressions (dysæsthesia), and to avoid them he buries the ears and eyes in the bed-clothes, and keeps the latter obstinately closed.

Diplopia, tinnitus, formicatio (pseud-æsthesiæ), and subjective sensations of various kinds are present. The sensorial disturbances are, as a rule, highly marked.

γ. Motorial. There is incessant restlessness, general or partial: the muscles of the face and limbs twitch involuntarily; there is strabismus, or unsteady eye-ball, with contracted or oscillating pupil; little or no prostration of strength; frequent vomiting, without epigastric pain or tenderness, and often without nausea.

This stage lasts generally from one to four days, its characteristics being—the combination of great nervous hyperaction, with marked fever, peculiar cry, cephalalgia, vomiting, and constipation.

c. Second stage. This is of transition character, presenting the features of the first and third in various combinations.

i. Extrinsic symptoms. The fever diminishes; the pulse sinks in frequency and force, becoming variable in frequency between very wide limits, and in very short intervals of time. Respiration is peculiarly irregular; the bowels continue constipated; tongue becomes furred and dry; the heat of head persists, but the body generally is cool.

ii. Intrinsic symptoms may undergo remarkable intermissions, sometimes disappearing altogether for a few hours, or for a day or two. This stage is not unfrequently absent: it consists only of transition phenomena, and a violent general convulsion may throw the patient at once into the third.

α. Mental. Delirium becomes quieter, and passes into coma, or the patient may appear quite collected and well.

β. Sensorial. The excitement diminishes and disappears; anæsthesia or hyp-æsthesia taking its place; cutaneous sensibility is rarely affected; the cephalalgia is little noticed; and drowsiness is the most common feature.

γ. Motorial. Muscular twitching undergoes some general increase, and is seen on both sides of the body; convulsions are common in the child, and spasm is found alternating with paralysis.

d. Third stage. This may exist immediately after the first, or it may be separated from the first by a week's duration of the transition (combined) phenomena of the second.

i. Extrinsic symptoms. Sunken face, and cold extremities; retracted abdomen; sordes on gums and teeth; pulse fluttering, thready, very feeble, and uncountable; marked general prostration.

ii. Intrinsic symptoms, are those of absent function.

a. Mental. Loss of perception, volition, and ideation, so far as can be ascertained by corporeal signs.

β. Sensorial. Total anæsthesia.

γ. Motorial. Absolute paralysis to almost every form of stimulus: first observed in the eyelids and eyeballs, then in the limbs: the muscular relaxation is complete, as evidenced by dilated pupil, stertorous breathing, involuntary micturition, and defecation.

The characteristics of the third stage, are the absence of nervous action, and the dying out of organic life.

The characteristics of the second stage, are the combination of transitional conditions, with a low organic state.

2. *Meningitis of the base.* This cannot always be distinguished from the preceding; but in some cases there may be probability of such a location, when the signs of sensorial and mental excitement are less marked: intelligence being preserved for a time (without delirium), and coma, or somnolence, occurring very early in the disease.

Duchatalet and Martinet consider profoundly-marked coma and spasm, when they occur in children, subsequently to fever and transient delirium, with suborbital pain, as highly characteristic of meningitis of the base.* Andral very fairly criticises this distinction, and cites instances of such occurrence when the inflammation has affected other localities.† Although this differentiation cannot be considered absolute, it probably expresses some approximation towards the truth.

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* De l'Arachnitis, p. 231.

† Clinique Médicale, tome v., p. 64.

B. Tubercular Meningitis. The older medical records of cases afford little assistance in the discrimination of this variety, since the tubercular condition of the membranes was not observed; many of the instances of this disease being placed, in all probability, under the head of simple (idiopathic) meningitis, others falling into the group of acute hydrocephalus. Dr. Whytt, in 1768, published an account of the symptoms to be noticed in so-called acute hydrocephalus,* and showed that they might assume two generic forms: the first being that which will occupy our attention now; the second, hurrying rapidly to a fatal issue, the "wasser-schlag" of Gölis, will be noticed hereafter. (See Chap. IX., Convulsions.)

The symptoms of tubercular meningitis differ in the child and the adult, and must be considered separately.

1. *Tubercular meningitis in the child:—*

a. Premonitory symptoms are of great importance; they are referrible mainly to extrinsic conditions. The general state of the patient has been that of ill-health; nutrition has been imperfect; for some weeks there may have been disturbance of febrile character; there are evidences of a scrofulous diathesis in either the child or its parents; the occurrence of irregular febrile attacks, which cannot be explained by apparent disease, or derangement of other organs, is suspicious; "frequent, short, dry cough" is placed by Dr. West among the premonitory symptoms;† vomiting and obstinate constipation of the bowels belong to the same category.

Among the intrinsic premonitory symptoms, it is found that the child complains, or has complained, of pain in the head; that it has sometimes staggered as if giddy, or has dragged the limbs in walking; that its manner is restless, and its temper capricious, sometimes appearing well and cheerful, at other times ill, cross, or peevish. These symptoms may be so slight as to escape notice altogether, or at all events that notice which they require.

b. First stage. (It appears to me desirable to describe separately the features of "stages," which may certainly in many cases be distinguished clinically, although it is by no means certain that they are related in the manner commonly described to anatomical conditions.)

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* Observations on Dropsy of the Brain.

† Diseases of Infancy and Childhood, p. 61.

i. Extrinsic symptoms. These are the occurrence of febrile disturbance, with slight thirst and anorexia; irregular, somewhat quick pulse; vomiting and constipation, or clayey evacuations, deficient in bile; red and moist tongue; dry, but not very hot skin; and other phenomena of general derangement; assuming an irregular, fluctuating, but not definitely remittent course of development in a previously unhealthy, and often scrofulous child.

ii. Intrinsic symptoms, often feebly marked.

α. Mental. Irritability of temper, peevishness, some slight delirium at night, rarely commencing early in the disease; disturbed sleep, and restless manner.

β. Sensorial. Pain in the head, dysæsthesia (intolerance of light and sound); vertigo, indicated by staggering, or clinging to objects for support.

γ. Motorial. Grinding of teeth, vomiting, unsteady restless movements, dragging of limbs.

c. Second stage. This arises after three or four days.

i. Extrinsic symptoms. Heat of head, flushed face alternating with pallor; irregular pulse, commonly when the child lies still it is of little frequency, but rises rapidly if the child is disturbed. The vomiting ceases, but the constipation persists, with retracted abdomen.

ii. Intrinsic symptoms become more marked, but occasionally undergo marked diminution; for a few hours, or for a day, the child appearing comparatively well.

α. Mental. The little patient keeps very quiet in bed, resisting attempts at disturbance, which appear to augment the pain. There is delirium, often fugitive, but sometimes persistent.

β. Sensorial. Cephalalgia increases; the expression of countenance is that of great suffering, and the face ages remarkably. The pain induces a peculiar piercing cry ("cri hydrenciphalique" of M. Coindet). The eyes are closed, and there is a tendency to drowsiness.

γ. Motorial. Strabismus, and muscular twitchings occur; the pupils are variable, often oscillating; and the eye-balls have a peculiar oscillating movement.

d. Third stage, may be the gradual intensification of the second; or may be rapidly entered by an attack of convulsions.

i. Extrinsic symptoms, are those of approaching dissolution; cold extremities, clammy perspiration, excessively rapid but feeble pulse, &c.

ii. Intrinsic; are at first those of exalted spinal action, then the signs of general prostration (cerebral and spinal).

α. Mental. Drowsiness passes into stupor, with an idiotic expression of face (to which Sprengel, Gölis, and others attached great importance). There is loss of perception and volition.

β. Sensorial. All signs of activity have given place to anæsthesia, the eyes are half open, and nothing appears felt.

γ. Motorial. Convulsions, with partial paralyses, subsultus tendinum, clenched hands, retracted head, and automatic movements; giving way to general relaxation, with occasional fibrillar contraction of the muscles.

The characteristic symptoms are, the occurrence of slight fever in an unhealthy child, with headache, obstinate vomiting and constipation; passing into a second stage of increased pain, with intolerance of disturbance, irregular pulse, delirium, and drowsiness; these pursuing an irregular course, and ending in convulsions, loss of perception, rapid pulse, cold extremities, and death.

The most important distinctions are from simple meningitis, and remittent fever: from the former it may be separated by the general condition and hereditary tendency of the child, and by the less degree of febrile excitement, and of sensorial hyper-action; from the latter, the distinction will be rendered obvious by a reference to Section V.

2. *Tubercular meningitis in the adult* presents many varieties in the course of its symptoms: occasionally they assume an

apoplectic, sometimes a convulsive, form at the commencement, but more commonly they pass through phases of development bearing considerable resemblance to those of simple meningitis. Louis describes three stages, and sometimes they are extremely obvious. The febrile character is generally but imperfectly marked.

a. Premonitory symptoms. These consist essentially of the tuberculous diathesis, in its common form phthisis pulmonalis. Meningitis may occur in any stage of the lung disease. The first point to be ascertained is the presence or absence of deposit in the lungs; for although, in rare cases, exceptions are found to the general law of Louis (that after puberty tubercle is not found in any organ without its co-existence in the lungs), yet the truth of that law is such that its application (deductively) to the class of cases under consideration is of the utmost importance. If there is, demonstrably, a healthy thorax, the probability is great that the meninges are free from tubercle: if, on the other hand, the symptoms mentioned below occur in a phthisical patient, the probability is great that his meninges are the seat of deposit.

b. First stage, which lasts from three to twelve days, is marked by:—

i. Extrinsic symptoms. The existence of demonstrable tubercle; and frequently some remission of the chest symptoms, cough, expectoration, &c., with vomiting, heat of head, flushed face, and injected conjunctivæ.

ii. Intrinsic, very variable in their course.

a. Mental. The intellectual state may be natural; or there is simply a bewildered look; a dull, heavy, expressionless face, often highly characteristic; mutism is not uncommon; Dr. Walshe * has mentioned the occurrence of this symptom in several cases which have fallen under his observation, some of which it was my advantage to observe when acting as his clinical assistant; and I have subsequently witnessed the same phenomenon in other patients. It probably depends upon a peculiar intellectual state, rather than upon any interference with the mechanism of articulation: the patient appears to understand what is said, or asked; looks at the inquirer for a few seconds, and then turns the head away without a reply. There is often marked somnolence.

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* Diseases of the Heart and Lungs, p. 392.

β. Sensorial. The most striking symptom is pain in the head, fixed to one spot, generally the forehead; of considerable intensity, and persistent for many days. There may be some intolerance of light and sound, but it is very rarely a marked phenomenon.

γ. Motorial. The first symptom may be, as I have had occasion to observe, an attack of convulsions. Dr. Brinton reported a similar occurrence to the Pathological Society (November 4, 1854). In another case, falling under my own observation, the first symptom was sudden loss of articulation. (In both instances, however, fixed pain in the head, great obscurity of perception, and dull, expressionless countenance were rapidly established). Louis states that paralysis is rare at an early period,* and this statement is (so far as I have seen) certainly correct.

c. Second stage; of very variable duration.

i. Extrinsic symptoms. The pulse is highly irregular; and alternate flushing and pallor of countenance are common.

ii. Intrinsic symptoms: these are either a simple intensification of those already mentioned, or some additional phenomena.

α. Mental. Dulness persists, sometimes alternating with mild delirium: the face becomes increasingly stupid-looking.

β. Sensorial. There is general obtuseness, or diminished impressibility.

γ. Motorial. Some paralyses to volition, alternating or coexisting with spasm of clonic or tonic character, strabismus, and occasionally convulsive attacks. The muscles are unduly sensitive to percussion; and in two cases which I have observed the contraction was not only highly marked, but took place only in the spot percussed, the fibres rising into a pyramidal elevation, and not extending along their course (towards the insertion of the muscle), as is usually the case, unless very forcibly impressed. It has appeared to me, although I cannot state it positively, that the percussion irritability in these cases was much greater than is ordinarily found in cases of phthisis. It does not exist in the chest muscles only, but in those of the limbs, and is generally more marked in those exhibiting some paralysis, than in others retaining their volitional motility.

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* On Phthisis, Syd. Soc. Ed., p. 281.

d. The third stage is marked by increasing stupor, immobility, and involuntary defecation and micturition.

The characteristics of this affection are, the occurrence of fixed pain; vomiting; dull intellect and face; with partial paralyses, or convulsions; slight fever; and diminution of the chest symptoms in a patient demonstrably tuberculous. The indications of inflammatory action are only feebly marked (not only during life, but post mortem); and very often the febrile state (hectic), which had existed before, becomes less noticeable at the onset of cerebral symptoms. Still, heat of head, injected conjunctivæ, and flush of face, denote a condition of vascular excitement.

Although tubercular deposit may occur in any portion of the meninges, we are unable to determine, from symptoms during life, the locality it occupies. It is well known that the fissure of Sylvius is very commonly the part affected, but the symptoms from such localisation resemble closely those which occur when the meninges of the upper surface are alone implicated.

C. Rheumatic Meningitis, or, as it may be more correctly termed, meningeal rheumatism, since there is little or no evidence of true inflammation, is prone to occur in the course of acute articular rheumatism. The symptoms should be looked for with great care, to separate them from those "sympathetic" phenomena which accompany pericarditis. The probability of their appearance is great in proportion to the intensity of the rheumatic fever, as judged of by the articular condition in respect of severity, and the number of joints implicated; and also in proportion to the general debility, or previous ill-health of the patient.

It has been supposed that the symptoms in question (frequently inexplicable by the post mortem condition of the meninges) are due solely to cardiac complication; but examination after death has proved that they may occur when the heart is free from disease, and hence a physical demonstration of endopericarditis does not destroy the probability of (idiopathic) cerebral complication. The symptoms resemble very closely those of simple meningitis; pain and delirium, during which the patient throws his limbs in all directions, utterly regardless of their rheumatic state, are the most marked phenomena at the outset. "Taciturnity and a strange waywardness" characterise some cases from the commencement.* Convulsions, coma, paralysis, and the train of symptoms mentioned under the head of simple meningitis follow, and death is the most common result.

The diagnosis is based upon the facts of:—

1. Rheumatic fever being present in a—
2. Weak or exhausted subject; and the sudden occurrence of—
3. Delirium, of marked, furious character,
4. Cephalalgia, and
5. Spasmodic movements; partial or general; followed by a—
6. Comatose condition, with paralysis.

The occurrence of meningitis as a phenomenon of blood disease is generally to be distinguished only by the extrinsic symptoms which pertain to that blood-condition: thus the meningitis of syphilis may be distinguished, and not by any special character to be observed in the intrinsic symptoms.

Throughout the preceding pages, attention has been directed to the diagnosis of febrile affections involving the pia mater and arachnoid; this is what we commonly understand by meningitis, but the dura mater may be primarily and principally affected, and often its inflammation may be separated from that of the pia mater by certain extrinsic symptoms and etiological considerations.

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* "Rheumatism, Rheumatic Gout, and Sciatica," by Dr. Fuller. p. 278.

§ II. INFLAMMATION OF THE DURA MATER.

The most important facts to be elicited are:—

A. The prodromata, or premonitory symptoms and conditions. Inflammation of the dura mater commonly arises from:—

1. External violence; a blow or fall upon the head; or—

2. Disease of some contiguous part; as, for example, caries of the bones of the skull in any part, but most frequently when affecting the internal ear, or the bones of the nose. The occurrence of head-symptoms subsequent to chronic discharge from the ear is always a highly suspicious circumstance.

B. The developed symptoms are of different characters, but generally assume one of the two following forms:—

1. Those of meningitis in its simple form (see p. 72), the pia mater being then commonly involved in the inflammation.

2. An insidious form; for example, pain in the ear or nose extends to the head, and increases in violence; the patient becomes drowsy, oppressed, and comatose; and may die without any other symptom. In other cases delirium and convulsions supervene, but they have no pathognomonic characters: the important points to be sought for are those mentioned above (A. The prodromata).

§ III. CEREBRITIS.

This inflammation occurs in two very distinct anatomical and clinical forms; the first is general, and is commonly combined with meningitis; the second is partial or local, and though rarely assuming a febrile form, does so occasionally, and requires a short notice in the present chapter.

A. General Cerebritis, meningo-cerebritis, phrenitis, or encephalitis, as it has been termed at different times, is presented under two different clinical phases, according to the predominance of inflammation (and its symptoms) in the meninges or the cerebrum itself.

1. First stage. This is of short duration; a few hours only, or three or four days. There may have been no premonitory symptoms.

a. Extrinsic symptoms. These are but feebly marked (unless meningitis predominates): there is some heat of head, and of surface generally: pale face: low and irregular pulse: variable and suspirious respiration: slight feverish oppression: headache, and vomiting.

b. Intrinsic symptoms; generally highly marked, and in proportion to the cerebral affection (as distinct from the meningeal) are those of diminished functional activity.

i. Mental. The patient is sullen, and his faculties become obscured; there is confused thought (rather than delirium, which occurs only in a mild form when the patient doses).

ii. Sensorial. There are no hyperæsthesiæ (except when meningitis is present); but there is deep-seated, violent, oppressive pain; described as shooting from the centre to the vertex, the temples, eyes, or ears; it (the pain) is out of proportion to the intensity of the fever, and does not diminish, as the latter very generally does, in the course of twelve or twenty-four hours.

2. Second stage. This may be ushered in by convulsions; or, after the first stage of two or three days, the patient may become simply comatose, and die in a few hours or days.

a. Extrinsic symptoms are unimportant: the pulse usually becomes rapid and weak.

b. Intrinsic symptoms are those of nervous (cerebral) inaction; coma, paralysis, anæsthesia, commonly following two or three convulsive paroxysms.

The distinctions from meningitis are the absence of excitement, and the rapid transition to marked loss of function: but as it has been already stated meningitis commonly complicates cerebritis, and thus the phenomena proper to each element are presented in various degrees of combination.

When the signs of meningitis are unusually severe, the pain deep-seated, and followed after twelve or twenty hours by convulsions and coma, there is commonly meningo-cerebritis of considerable extent.

B. Partial or Local Cerebritis. The symptoms attending this form of inflammation, commonly termed "red softening," or "acute ramollissement," resemble more closely the non-febrile than febrile affections. (See Softening, Chapters VII. VIII. and IX. Apoplectic, Delirious, Convulsive.) When combined, however, as they frequently are, with those of meningitis, they appear in a quasi-febrile form, and consequently require some notice in this place.

1. Premonitory symptoms, of intrinsic character, are by no means uncommon. They may be resolved into:—

a. Mental. Some loss of intellectual vigour, failure of memory, confused ideation, consciousness of weakness, &c.

b. Sensorial. Pain in the head, deep-seated, fixed, protracted; tingling and numbness in one limb or side; imperfection of the special senses; dimness of sight, dulness of hearing, &c.

c. Motorial. Loss of power on one side.

2. The developed symptoms assume various forms. In that under consideration now there are:—

a. Extrinsic; more or less fever, in proportion to meningitis; heat of head, vomiting, and general malaise.

b. Intrinsic; the signs of meningitis feebly marked; or convulsions, followed by coma, and partial paralysis, with rigidity, returning more or less rapidly, and ending fatally in a day or two, or from two to three weeks. Thus there may be the symptoms of meningitis or of cerebritis, or of the two together, occurring after certain prodromata, and leaving little doubt of the existence of partial cerebritis.

§ iv. CONTINUED FEVER.

No greater difficulty of diagnosis can occur than that which is sometimes presented by a case in which the question arises, whether the symptoms are due to meningitis with fever of a low (or typhoid) type, or to typhoid fever with cerebro-meningeal complication. The question is not so much whether actual inflammation is or is not present (for it may exist in the latter); but whether that inflammation (or cerebro-meningeal condition) is primary or secondary; in other words, whether the fever is the result, or secondary product of the inflammation, or whether the inflammation is one of the many secondary phenomena of the fever. (The term "fever" being here employed to denote the general organic condition induced by a specific morbid poison).

The diagnosis can only be established by a consideration of each class of symptoms, in their absolute and relative development. In the following paragraphs the contrast will be drawn between typhoid and typhus fevers on the one hand, and idiopathic meningitis on the other.

A. Prodromata, or those symptoms which occur prior to the appearance of marked cerebral symptoms.

1. Extrinsic. These are rigors followed by febrile reaction, its oppressive headache, anorexia, and general (systemic) disturbance; often by vomiting and diarrhœa (in typhoid). The pulse is frequent and feeble, and the expression of countenance dull and heavy.

2. Intrinsic. Mental confusion or incapacity with sensorial disturbances, such as tinnitus aurium, muscæ, &c.; and general restlessness, with occasional twitchings of muscles.

It is to be borne in mind that these symptoms, so common in continued fever, rarely exist to such a marked degree in meningitis, without being accompanied by others of much greater intensity and more serious character.

B. Developed symptoms. In the majority of cases the extrinsic signs of general disturbance are sufficient to account for all the intrinsic phenomena, the latter bearing a direct proportion to the former; but in others doubt arises, and in order to remove it we have to consider seriatim:—

1. Extrinsic. There may be the special signs of typhoid, or typhus, viz., the peculiar exanthem of each (rose-coloured, lenticular spots, or the mulberry rash). In either case these are demonstrative evidence of a specific disease. But they may be only doubtfully developed, and we have to carry the investigation further. Epistaxis, and enlargement of the spleen, are common. The pulse is frequent and often irregular; but it does not present the notable variations observed in meningitis. The expression of face is peculiar, and its colour "muddy-looking" in typhus. (See intrinsic symptoms,

mental). In typhoid there is abdominal pain, tenderness of the iliac fossæ, gurgling in the right, and diarrhœa, with evacuations of peculiar character: none of which is constantly or equally marked in meningitis; whereas there is not the frequent, abundant, and persistent vomiting of the latter. In typhus, there is a degree of general prostration almost unknown in other diseases. Complications of bronchitis and pneumonia occur much more frequently than in cerebral affections. The conjunctivæ may be injected, but not to the degree observed in meningitis.

2. Intrinsic symptoms (or derangements of nervous functions).

a. Mental. The expression of countenance may be natural in typhoid; in no one of forty-three cases of typhus was it natural throughout (Jenner).* In typhoid, as a rule it is oppressed and heavy; in typhus the oppression is still more marked. Dr. Jenner describes it as that of "a drunken man just disturbed from sleep." This is a notable distinction from meningitis; but in rare cases of typhoid the expression is highly vivacious. Delirium is present in a large majority of cases of fever; it may commence on the third day, but is more common in the second week. In general, it is of mild inoffensive character, and is preceded by confusion of thought. The dulness of delirium is most marked in typhus; and although, in exceptional instances, it may be vivacious in typhoid, it rarely, if ever, assumes the violent, fierce character found in meningitis. In continued fever, delirium is in proportion to the febrile state; in cerebral affections, it is more highly marked than the fever will account for. Somnolence is frequent, and often profound, but its approach is more gradual than in meningitis. Thus typhoid, much more commonly than typhus, is the source of difficulty; but its extrinsic characters are more distinctive.

b. Sensorial. Hyperæsthesiæ, or more properly dysæsthesiæ, are extremely rare. Pain in the head is rarely absent; but it is of much less intensity than in inflammation; it is rarely within the patient's powers of description, (either from his confused intellectual condition, or the diffused extent and unmarked character of the pain itself); and it almost invariably disappears when delirium sets in. These characteristics differ widely from those of inflammation, the patient with meningitis constantly screaming with pain in his wildest delirium. The sensorial changes which occur in fever are commonly those of deficiency, such as deafness, and general unimpressibility.

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* Typhus, typhoid, and relapsing fevers, p. 20, and seq.

c. Motorial. Spasmodic twitchings occur in the muscles of the typhoid patient: general convulsions sometimes occur in typhus. Retention of urine, and its involuntary discharge when present in the latter, are observed at an earlier period than when resulting from primary cerebral affections.

If all these differences are duly considered, there can be little doubt, except in rare cases; and these rarer cases are those in which, most probably, in addition to the effect of a special poison circulating in the blood of the nervous centres, there is more or less variation from the healthy standard in respect of its physical conditions of supply; viz., congestion of the cerebrum, its meninges, or both; and of this congestion, the symptoms referred to are the vital (dynamic) phenomena.

The important object for diagnosis is, not the precise anatomical condition of the encephalon, (whether there is inflammation, or congestion), but whether the cerebral state (whatever it may be), is idiopathic, and is to be treated as such; or whether it is merely one of many results produced by a general, systemic disease: and this object we may attain, in the greater number of cases, by the indications already pointed out.

§ V. GASTRIC REMITTENT FEVER.

This form of disease has greater resemblance to tubercular meningitis of the child than to any other acute febrile affection involving the nervous centres. It is more likely that tubercular meningitis may be mistaken for remittent fever, than ***vice versa.*** The following symptoms are the basis for their separation:—

1. Extrinsic, (forming the most important distinction).

The fever is more marked; has a distinctly remittent character; and the pulse is in proportion to the febrile excitement; not exhibiting the notable changes of tubercular meningitis.

Remittent is rare before the sixth year, almost unknown before the fourth.

The tongue presents a thin fur at the base and centre; but is red elsewhere, soon becoming dry. There is urgent thirst, and great heat of skin. Vomiting is frequent, though not so persistent as in acute hydrocephalus, and it is often bilious: the bowels are commonly relaxed, and the evacuations offensive: the abdomen is tender, especially in the iliac fossæ. There may be no evidences of a scrofulous tendency.

2. Intrinsic, often very slightly marked. The headache is less severe than in tubercular meningitis: delirium occurs early, but is in proportion to the fever: the expression of countenance is unchanged, or is not changed in the peculiar manner described: and there is a general absence of the essential nervous symptoms, enumerated at p. 75 and seq.

§ VI. HYPERÆMIA CEREBRI.

This state resembles very closely the first stage of meningitis of which it is probably the earliest anatomical condition; but the symptoms are less intense; have some special characters (negative); do not pass into more complicated stages of development; and are more amenable to treatment.

The pain is not of violent intensity, or darting character; being more commonly general, diffused, and oppressive; with a sense of weight.

There is less tendency to vomiting, and constipation is accidental only, and easily overcome by medicine.

There may be the general signs of plethora; with bounding, full pulse; and there is commonly some distinct occasional cause to which the symptoms are referrible.

There are no positive indications of anything more than hyperæmia.

§ VII. DELIRIUM TREMENS.

The special character of this disease in its most common form will be found in Chap. VIII. Its symptoms sometimes assume a febrile development, and may thus be confounded with those of meningitis. A diagnosis may, however, be very generally established, without much difficulty, by attention to the following points,—

1. Extrinsic symptoms. The fever is not highly marked, there is a peculiar, clammy sweat upon the skin; the tongue is foul; the secretions highly offensive. The antecedent conditions have been related to alcoholic stimulation (see Chapter VIII.)

2. Intrinsic symptoms. There is very little pain in the head; it is never in simple delirium tremens of the marked intensity commonly found in meningitis. The delirium is mild, and usually inoffensive. The patient's mind is haunted with spectres that produce a suspicious, fearful expression of countenance. There is great restlessness, most intractable insomnia, and a peculiar tremulous condition of the limbs.

The symptoms resolve themselves into disturbances of ideation, perception, and emotional movement, rather than of sensation and volitional motility; and the general condition is that of a morbid blood-change (all the secretive processes being out of order), rather than a state of febrile reaction, the result of a local inflammation.

§ VIII. ACUTE MANIA.

There are not many cases in which mania would be confounded with meningitis. The febrile disturbance, which occurs at the commencement of the former, being much too in distinct in character to be mistaken for that of the latter.

However, the onset of mania may resemble very closely that of inflammation, and doubts may occur as to the nature of the malady. It is not my intention to enter at any length upon the diagnosis of mental diseases; they will be only alluded to so far as they may be the sources of fallacy.

A. The premonitory symptoms of mania have generally existed in the sphere of intellectual or moral life. Some change of manner, of the mode of thought, of the habitual frame of mind, or of the emotions, may have been noticed, and traced to a mental cause. This is not the case in meningitis.

B. The developed symptoms. Allowing that fever exists (in the cases at present under notice), it is of less marked character than in meningitis: and the intrinsic symptoms are peculiar:—

1. Mental. There is some one, or there may be several fixed delusions, false ideas, upon which the individual reasons more or less correctly, and upon which he acts.

2. Sensorial. There is little complaint of pain in the head (the patient's erroneous ideas absorb his attention). There are not the dysæsthesiæ of meningitis, (sights and sounds do not occasion pain), but there are true hyperæsthesiæ, often of most extreme intensity, (the patient hearing and seeing things which escape the notice of those in health); and there are metæsthesiæ or false sensations, referred to the patient's own body, or to the space surrounding him. These are of subjective origin, and ordinarily coincide with, and support his delusive ideas.

3. Motorial. The phenomena are not of distinctive character; but their negativity (the absence of paralysis and spasm) is sometimes of service. There is often an apparent increase both of the force, and persistence of voluntary movement.

The peculiar condition of the mind, and sensorial functions will generally serve to distinguish mania from every other affection, even at the onset; but its subsequent course is still more distinctive, presenting the absence of those stages of development (implicating the motorial, and sensory powers), which have been described under meningitis.

CHAPTER VII.

THE APOPLECTIC DISEASES.

It has been already stated (Chapter V. p. 64), that the word "apoplectic" is here employed to define a clinical group of symptoms, and not a pathologico-anatomical condition. Loss of perception, voluntary motion, and sensation, (the external phenomena of apoplexy), may be owing to one or more of the following structural changes:—

- I. Congestion of the brain; or "coup de sang."
- II. Hæmorrhage; extravasation of blood. ("Apoplexy" proper.)
  - A. Hæmorrhage, into the substance of the hemisphere·
  - B. Ventricular hæmorrhage.
  - C. Arachnoid hæmorrhage.
- III. Serous effusion in large quantity. ("Serous apoplexy.")
- IV. Local cerebritis; or "softening of the brain."
- V. Tumor of the brain, or meninges.
- VI. Tubercular meningitis.
- VII. Urinæmia, and diathetic states.
- VIII. Anæmia; morbus cordis; vascular obstruction.

§ I. CONGESTION; OR, COUP DE SANG.

M. Sandras, in his recent treatise upon nervous diseases, makes the distinction between this congestive form of apoplexy, and another which he terms "apoplexie nerveuse," in which there is found post mortem "no vestige of a material lesion."* The symptoms which he states to accompany this form of disease are not of the kind most commonly observed in cerebral congestion; but on the other hand, they are not sufficiently distinct to separate the two; as it is impossible, from the negative evidence of post mortem examination, to demonstrate the absence of vascular (dynamic) changes during life.

It may be that hyperæmia in some cases, and anæmia in others, have been the occasional causes of the apoplectic seizures: and, therefore, it is not my intention to constitute nervous apoplexy into a distinct class, although this has been done from the earliest time to the present. This is not because it has been demonstrated that morbid symptoms never occur without some cognisable structural change; but because it is exceedingly difficult to arrive at certainty with regard to the existence or non-existence of those changes which are dynamic; and because the phenomena which have commonly formed the features of nervous apoplexy, are of such a character as to warrant the inference that such (dynamic) alterations do take place. (See appendix B.)

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* Traité pratique des maladies nerveuses. Tome 1, p. 326.

All the apoplectic diseases will be considered in respect of three periods:—1st. The premonitory, or period of prodromata. 2nd. The attack, including its immediate precursors and sequelæ. 3rd. The stage of recovery, or the reverse.

1. Precursory symptoms. As congestion frequently accompanies or precedes all the apoplectic diseases, its symptoms are often present as their prodromata. When congestion, however, forms the whole anatomic basis of developed apoplexy (the case now under consideration), they are of more marked intensity, and have commonly existed for a longer time. These symptoms are so familiar that it is not my intention to detail them, farther than will suffice to point out those which are the most prominent, and which it is the most important to observe, in order to arrive at some conclusion whether congestion alone, hæmorrhage, or softening is the cause of an apoplectic attack.

a. Intrinsic; (in this case the most valuable.)

i. Mental. There is diminished intellectual activity and power; a general confusion of thought, with deficient memory. This state is increased by any attempt at mental exercise, by the recumbent position, and by emotional disturbance. There is a tendency to inaction (of body as well as of mind); sleepiness, with laboured respiration, especially after meals. This mental condition is not permanent; there is no special and persistent loss; but a readily induced state of general confusion.

ii. Sensorial. The senses are obtuse; the hearing is dull; and there are heavy, rumbling noises in the ears; the sight is dim, and often black spots appear on the field of vision; there is vertigo, with a sense of fulness and oppression in the head; numbness and weight of the limbs; dull, heavy cephalalgia. These symptoms, however, change their localities, and are only occasional in their occurrence. Abercrombie speaks of the absence of pain as a distinction from hæmorrhage; but this cannot be considered of much diagnostic value, although the occurrence of acute (severe) pain would be indicative of something more than congestion.

iii. Motorial. There may be little jerkings of the muscles generally, and occasional diplopia probably indicates irregularity of the ocular muscles; but the most common feature is sluggishness of movement. There is no definite loss of power on one side, or in one limb.

b. The extrinsic symptoms, referred to the head, are increased vascularity of the face, scalp, and conjunctivæ; a dusky, venous tint of skin; warmth of surface; fulness of the jugular veins, and increased pulsation in the carotids. Those which are referred elsewhere, are a foul tongue, nausea, constipated bowels, laboured respiration and pulse, with cold extremities.

2. Phenomena of the attack. The seizure commonly takes place during some muscular exertion, such as lifting a heavy weight, blowing the nose, straining at defecation, &c.; or upon a change of posture, such as stooping, &c. The precursory symptoms have generally been more intense for a few minutes or hours.

a. Intrinsic symptoms of the attack.

i. Mental. Perception is rarely completely absent; some evidences of its presence may be obtained by loud noises, speaking to the person by name, pinching, &c. If quite extinct for a few seconds or minutes, it soon partially returns; and there is confused thought, with very little volitional power for the direction of idea or movement.

ii. Sensorial. The changes are slight, except for the first few moments of attack, and then they are general in extent—*i. e.*, not limited to one side. The patient, however, usually appears to feel (although distinct perception as a mental act may be absent), the limbs are withdrawn if pinched, and sensibility is rarely, if ever, affected without a corresponding implication of motility.

iii. Motorial. All the limbs are more or less paralysed, to a slight degree, and for a short time (there are exceptional occurrences of hemiplegia and paraplegia, but they are rare):

stertor, and involuntary evacuations do not occur, unless there have been some convulsions. (The morbid state is not sufficiently severe to affect tonic contraction.) There is no rigidity of the limbs; but clonic spasms are not unfrequent.

The symptoms begin to abate rapidly; generally in the course of a few minutes: they rarely last for an hour. Paralysis disappears with the return of consciousness (perception and volition); and sensibility scarcely ever retains any lesion. Exceptions occur, but the rule is as stated above.

b. Extrinsic symptoms are the absence of œdematous ancles, albuminuria, or other signs of diathetic disease. The pulse is variable in its characters, not so much laboured as in hæmorrhage: there is great vascularity of the surface of the head, with violet lips, and throbbing carotids.

c. Manner of appearance, and proportion between the three groups of intrinsic symptoms.

i. They are developed simultaneouly. There is either

ii. Distinct loss of perception (profound coma), and general paralysis, without rigidity or convulsion.

iii. Imperfect loss of perception, with general paralysis.

iv. General paralysis, incomplete in degree; and sensation unimpaired, or but little affected; or,—

v. Paralysis complete in degree, but without stertor or rigidity. These are the most frequent combinations, any one of which affords evidence of congestion rather than of hæmorrhage, or softening.

3. Period of recovery. If active and judicious measures are employed, the recovery may be rapid, and complete; but if this is not the case, there is a return to the chronic condition of liability to attacks of congestion, the phenomena of which are described in the paragraphs upon the period of prodromata. It is exceedingly rare for paralysis or anæsthesia to remain.

§ II. HÆMORRHAGE.

A. HÆMORRHAGE INTO THE SUBSTANCE OF THE HEMISPHERES.

1. Period of prodromata. Very different statements have

been made with regard to its phenomena. In some cases there may be absolutely no premonitory symptoms. Durand Fardel states, that in thirty-five of a hundred-and-forty cases, "the absence of all prodromata has been positively recorded."* Rostan says that their occurrence is exceptional.† Grisolle that they occur in one-tenth only.‡ Gendrin remarks, that it is rare for them not to occur, and he accounts for the frequent statement of their absence, by the fact, that the data upon which it is based are furnished mainly by hospital patients, who belong to a class of society not in the habit of paying much attention to slight derangements of health.§ It is evident that not much stress can be laid upon the diagnostic value of positive prodromata. Pain is present in some cases (13 of 140, Durand Fardel) immediately before the attack; but the most important point to bear in mind is, that the non-existence of precursory symptoms in a given case, is in favour of hæmorrhage rather than of congestion or softening, since in each of the latter their presence is exceedingly common. By far the larger number of cases which have fallen under my own observation have been free from ascertainable prodromata, or have presented only occasional congestion.

2. The attack is sudden, and rapid in its development to a certain point of intensity. Sometimes, after a few hours, there may be an aggravation of symptoms (such as deepening coma, &c.); but the second occurrence is also sudden, and is generally the result of renewed extravasation. The patient, as a rule, if standing, falls instantly as if knocked down. Exceptions, however, occur to this: Abercrombie relates two cases in which the symptoms were developed gradually.¶

a. Intrinsic symptoms are almost exclusively important.

i. Mental. Loss of perception and volition are commonly complete at the onset; the patient appearing, at all events, for a few seconds, utterly deprived of intellectual power: after a few minutes (in slight cases), but more commonly after some hours, perception and ideation partially return; and there is confused thought, sometimes passing into delirium. The momentary occurrence of profound coma is not necessarily an indication of extensive hæmorrhage; but after the first few minutes or half-hour has passed, the degree of intellectual obscuration may be taken as an approximative measure of the amount of extravasation. It must be remembered, however, that in some cases of hæmorrhage, the mental faculties are very slightly, if at all, implicated. These are exceptional, and rare in their occurrence.

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* Maladies des Vieillards, p. 247. † Gazette des Hopitaux, 1850.

‡ Pathologie interne, tome i., p. 646.

§ Traité Philosophique de Médecine Pratique, tome i., p. 378.

¶ Diseases of the Brain, Spinal Cord, &c., p. 234 & seq.

After some days the intellectual powers are often entirely restored; but in many cases confusion of thought, and partial losses of memory, remain. If, however, the coma does not continue profound, and the case terminate fatally, it is usual for the patient to recover to a notable extent; and this restoration is one strong presumption of hæmorrhage, as distinct from softening.

ii. Sensorial. Sensibility is less commonly, and less intensely affected, than motility. When cutaneous anæsthesia is complete (even though limited in extent), it indicates severity of lesion. The hypæsthesia assumes a uni-lateral distribution; and in slight cases there is only numbness and tingling of the tips of the fingers. Evidences of sensation may be obtained when there is no proof of distinct volition. Pain in the head, and affections of the special senses, are of rare occurrence. During the profound coma of the attack at its commencement, the dilated pupil, and the half-open eye, indicate that the retina has lost its impressibility; but this condition, and its analogues in the senses of hearing, taste, and smell, speedily disappear. Such lesions are an indication of severity of hæmorrhage; their persistence a sign of extremely evil omen. Generally, the return of sensibility takes place long before that of motility. Hyperæsthesia is of very rare occurrence.

iii. Motorial. The changes of motility are of two kinds, the loss or diminution of volitional, and the increase of avolitional contraction. *a*. Paralysis is present in the immense majority of cases. (Abercrombie relates two instances of its absence.*) The characteristic form of its distribution is hemiplegia; but sometimes it is general (the former occurs in ·84, the latter in ·16 per cent.) When, however, the paralysis is general, the hæmorrhage is rarely limited to the substance of the hemispheres. During profound stupor, the deviation of the face indicates unilateral paralysis; in less severe cases, the condition of the limbs, in respect of volition, is the guide. The tongue commonly deviates to the paralysed side; and any extreme movement of the face, such as laughing, crying, &c., renders the inequality of action more apparent. The orbicularis oculi generally escapes paralysis, or is much less implicated than the other muscles of the face. The loss of motility is most complete at the first; it is commonly absolute in degree, especially in the arm, which is more profoundly affected than the leg. When both sides are paralysed, one is usually more completely paralysed than the other. Stertor, with involuntary defecation and micturition, are common.

There is generally no loss of spinal motility (except during the state of shock existing immediately after the extravasation); when signs of such deficiency are present, they indicate severity of lesion. The immobile pupil, and difficulty of deglutition, with slow and laborious respiration, are common at the moment of attack; but their persistence for some hours is incompatible with the existence of a slight hæmorrhage.

β. Involuntary contraction. This may be of two kinds, clonic and tonic; but either is extremely rare in hæmorrhage limited to the cerebral substance. The presence of either with limited hæmorrhage is more rare than their absence, when extravasation has extended farther. (See Ventricular Hæmorrhage, p. 100.)

b. Proportion between intrinsic symptoms.

i. Profound coma, with hemiplegia (limited in extent to one side, but) of marked intensity, and without rigidity.

ii. Paralysis of both sides, but one more profoundly affected than the other (rare in limited hæmorrhage).

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* Diseases of the Brain, Spinal Cord, &c., p. 330.

iii. Coma slight, but paralysis hemiplegic and complete. These are the more common combinations from which the existence of hæmorrhage, limited to the medullary substance, might be inferred.

c. Extrinsic symptoms. The special object to be borne in mind is the exclusion of diathetic diseases. The probability of hæmorrhage is greater in cases of hypertrophous heart, than in healthy individuals. Not much importance can be attached to this observation. During the attack, the pulse and respiration are generally laboured, the face and scalp are of deep livid tint, and there is often increased pulsation of the carotids. There may be, however, precisely the reverse of these conditions in cases of marked hæmorrhage.

3. The period of recovery. Unless the lesion is very severe, and in this case rapidly fatal, the symptoms diminish in a short time. The process is much more slow than that observed by congestion, but much more distinct and more rapid than that of softening. The commonest occurrence is the perfect recovery of mental faculty, and the progressive, but much more gradual, return of motility and sensibility, or the persistence of motor paralysis in some groups of muscles, such as those of articulation, of the fore-arm, and hand. Sensibility is restored first; then the motility of the lower extremity; then that of the arm; and, lastly, that of the fore-arm and hand. Duchenne has pointed out the existence of two conditions of paralysis—one dependent directly upon the central lesion; the other being merely the secondary result of habitual inaction for some time past (this inaction having been primarily caused by the cerebral injury). In the former case, he affirms that it is common to find contraction of the muscles (the evidences of spinal action, increased by the fact of persistent central changes, removing cerebral control): in the latter the muscles are flaccid. Duchenne further states that active tonic contraction of the muscles (distinct from simple shortening of the flexors) indicates some inflammatory action in the walls of the cyst.* This distinction appears to me based upon insufficient data; but it

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* De l'Electrisation localisée, 1855, p. 713, *et seq.*

may be borne in mind, and either corroborated or contradicted by subsequent observation.

With regard to the condition of the muscles, in respect of electric-stimulus, there are many different statements. Dr. Hall was of opinion that they were more irritable than those of the non-paralysed limb. Dr. Todd and others held precisely the reverse. Duchenne, Meyer, and Guitard agree that the irritability is not diminished (as it is in spinal or traumatic paralysis); but, from my own experiments, I have found the irritability notably less (in the paralysed limbs), in a very large majority of cases. The causes of such discrepancies are not very apparent.

B. VENTRICULAR HÆMORRHAGE.

This cannot, in some cases, be distinguished from arachnoid extravasation, and in others, from effusion into the cerebral substance only: but there are other cases in which very little room is left for doubt. There are the general signs of apoplexy, but with these distinctions.

a. Mental state. The coma is very profoundly marked at the commencement of the attack, and remains of equal intensity; or the patient, after partially recovering from a slight seizure, is again suddenly plunged into profound coma, from which there is no recovery. (In the latter case, the earlier attack indicates simple medullary hæmorrhage; the second attack, the rupture of hæmorrhage into either the ventricles or the arachnoid cavity).

b. Motility is affected in two directions.

i. Paralysis is complete in degree, and is developed simultaneously in both sides; or, after having been hemiplegic for a short time, there is a second attack (marked by profound coma, &c.), and the paralysis becomes general. There is marked stertor; involuntary evacuations; dilated pupil; difficult and dangerous deglutition. General paralysis succeeding hemiplegic, and, attended by profound coma, is almost pathognomonic of ventricular hæmorrhage of considerable extent: since limited hæmorrhage, or softening, would not occasion the general paralysis, and the profound coma is inconsistent with the idea that congestion is its only cause.

ii. Rigidity, or tonic contraction of the muscles, is present in many cases of hæmorrhage (in two-thirds, Durand Fardel); it generally (19 of 26) occurs in the paralysed limbs: sometimes is seen in those of the healthy side (4 of 26). This symptom has been carefully recorded only of late years, and its diagnostic value has been somewhat misinterpreted. Lallemand stated that it was not a sign of hæmorrhage.* M. Boudet pointed out that its real significance was the bursting of hæmorrhage into the ventricles, or the arachnoid cavity;† and Durand Fardel's cases confirm the truthfulness of this general statement.‡ In all cases (of hæmorrhage) in which rigidity was present, blood was found in the ventricles, or arachnoid cavity; but in four cases with these anatomical conditions there was, during life, simple resolution of the muscles. The presence of tonic contraction is, therefore, a sign of extensive, lacerative hæmorrhage; but its absence does not prove the reverse. According to Durand Fardel, rigidity is more common in cases of hæmorrhage (ventricular) than of softening. Convulsive phenomena sometimes occur, but they are of greater rarity.

The most frequent combination of symptoms presented by ventricular hæmorrhage is that of profound coma, with general paralysis and rigidity.

C. ARACHNOID HÆMORRHAGE.

When extending from the hemispheres, and bursting through the pia mater and arachnoid into the inter-membranous space, its symptoms cannot be distinguished from those of ventricular extravasation; but when occurring primarily (and especially when sub-arachnoid in its locality, and limited in extent), it may be diagnosticated with some approximation to certainty.

1. Precursory phenomena. It is not at all uncommon for pain in the head, of somewhat severe character, to have existed for a certain time. There may have been slight impairment of motility or intellectual oppression. These symptoms

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* Lettres sur l'Encephale, II., p. 259.

† Mémoire sur l'hémorragie des Meninges.

‡ Maladies des Vieillards, p. 255.

are probably related to an unhealthy condition of the meninges.

2. The attack is not so sudden as in congestion or central hæmorrhage, although in some cases it is precisely similar. The symptoms are developed seriatim, and rarely simultaneously.

3. The following combinations of phenomena indicate a probability of arachnoid hemorrhage.

i. Complete loss of perception (profound coma) without paralysis; or with general paralysis very slightly developed in intensity.

ii. Complete loss of perception and volition without paralysis; but combined with rigidity or clonic contractions of the limbs.

iii. Paralysis of hemiplegic distribution as regards the limbs, but without deviation of the features (muscles of the face not implicated).

iv. An apoplectic attack without anæsthesia. Prus thought this absence of anæsthesia pathognomonic; but it is not so.

v. Imperfectly developed coma (partial loss of perception and volition), with general paralysis.

vi. An apoplectic attack of which the symptoms are somewhat interchangeable, and assume a remittent course.

§ III. SEROUS EFFUSION ("SEROUS APOPLEXY").

There is no certainty, or even approximation to certainty, in the diagnosis of this condition, and it was long since pointed out by Dr. Abercrombie that much doubt should be entertained with regard to the commonly received opinions upon the relation between this physical condition and the apoplectic state. It has not yet been shown that the effusion is the cause of apoplectic symptoms; or that it necessarily and *per se* induces any. The advance of our knowledge will probably place many cases of serous apoplexy into the category of blood-diseases ; and many others will find their proper place through the revelations of microscopic anatomy. The work required with regard to this disease is that of the Pathologist: its special clinical history is at present unknown.

The cases on record resemble, on the one hand, hæmorrhagic effusion or acute softening; and on the other, simple congestion. Dr. Abercrombie relates instances of hemiplegia and paraplegia; and other authors detail symptoms from which it is impossible to construct a succinct and specific history. The only real guide that we have, is negative evidence; or want of resemblance to other forms of apoplexy; and, what is much more important, the recognition of serous effusion in other organs of the body; whether arising from toxæmic (diathetic) conditions, or from these, plus mechanical obstruction in the circulating organs. In Bright's disease, when apoplectic symptoms have occurred, and the patient has died comatose, serous effusion is frequently discovered in the ventricular and arachnoid spaces ; but the symptoms are due, more probably, to the poisonous material in the blood, rather than to the mechanical pressure of effusion: the coma is of peculiar toxæmic character (see urinæmia, post. p. 109), and not that which results from compression. In the present state of medical science we must leave the diagnostic signs of " serous apoplexy " to be unravelled by further investigation.

§ IV. PARTIAL CEREBRITIS, OR ACUTE RED SOFTENING.

It would be quite out of keeping with the intention and scope of this work to enter upon any discussion of the quæstio vexata of the nature of this affection. With regard to its pathology, if one thing is beyond all question, it is that its clinical history closely resembles that of cerebral hæmorrhage, and that some of the greatest difficulties of diagnosis are to be encountered in the attempt at their separation. And it may be here stated at the commencement of this section, that in some cases the differentiation is impossible—*i. e.*, that some cases occur in which the probability is about equal (so far as we can ascertain) that hæmorrhage or softening may be present. In another group of instances, the diagnosis may be established without much difficulty by attention to the following points:—

1. Precursory symptoms. These may be entirely absent. M. Rostan, who speaks confidently of their presence and

importance, relates one half of his cases as free from them.* Durand Fardel observed their absence in a still larger proportion (in 18 of 32).† When present there is nothing very distinctive in a considerable number of instances, the phenomena being simply those of occasional cerebral congestion. (See p. 91). In other cases they afford strong probability of softening. This is felt if cephalalgia of dull character, feelings of numbness, and confusion of thought, with defective memory, irritability of temper, and slight motorial deficiencies, have been observed for some time; and especially if these changes have been somewhat persistent in their character and locality, and have been referred more to one side of the body than the other. The imperfection of movement or sensation in one limb or side is the most important; but while the presence of such symptoms is of much value in revealing the probability of softening, their absence is of by no means equal value in establishing the reverse. There is not unfrequently a peculiar, dull, expressionless, or silly face for some little time before the attack. The patient loses control of emotion to a certain extent, and complains of pain in the limbs. These are, however, more common phenomena of softening in its chronic form. It is by no means rare to find that the patient has suffered for some time from an extrinsic chronic disease. ‡

2. The attack may be gradual or sudden—*i. e.*, there may be a progressive diminution of intelligence, motility, &c., for some hours or days, at the end of which the patient is in an apoplectic condition; or the seizure may be sudden and instantaneous. In the latter case, the attack is, however, due to congestion; the symptoms of which passing away, those of softening remain.

a. Mental. Transient excitement or mild delirium may precede the abolition of perception, and when this does occur, it is highly characteristic. Coma is frequently developed abruptly, and is often of this peculiar character. The patient lies still, apparently in profound sleep, but immediately gives the hand, or puts out the tongue, if told to do so. Sometimes, although the other symptoms are well marked, the intelligence remains intact. The loss of perception and volition (though often not so complete after the first few minutes as at the onset of the attack, owing to the removal of congestion) is not recovered from, as in cases of hæmorrhage or hyperæmia; but dulness and obscuration of thought and perception remain, and this often to a marked degree.

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* Ramollissement du Cerveau, and Médecine Clinique.

† Ramollissement du Cerveau, et Maladies des Vieillards, p. 98.

‡ Valleix. Guide du Médecin Praticien, tome iv., p. 488.

b. Sensorial changes are less frequent and less marked than motorial. Generally there is anæsthesia or hypæsthesia in the paralysed limb; but in exceptional cases hyperæsthesia has been observed. Some authors have attached great importance to this symptom, considering it pathognomonic of ramollissement. This it is not; but it is more common in softening than in other apoplectic diseases. Numbness and a sensation of cold are not at all unfrequent: pain in the head occurs, but with no special frequency.

c. Motorial symptoms are of two kinds:—

i. Paralytic. The face-muscles act unequally, producing deviation of the features. This is sometimes very slight, at other times highly marked. Speech is affected (impaired) with great constancy; and after slight recovery there is nothing like the power of speaking which returns in hæmorrhage. Paralysis is commonly limited to one side, sometimes to one limb, but in rare cases it is general.

ii. Spasmodic contractions occur in two forms (tonic and clonic). Rigidity or occasional spasm may be found in either the paralysed or non-paralysed limbs: most commonly in the former.

3. The proportion between the symptoms, and their various combinations are of more diagnostic value than the simple fact of their presence. Those which may be, with most probability of correctness, referred to softening are the following:—

i. Imperfect coma (partial loss of perception and volition), with rigidity of the limbs (since congestion does not induce rigidity, and ventricular hæmorrhage developes profound coma).

ii. Perfect coma (complete loss of perception and volitional power), without rigidity. (Since congestion does not induce profound coma: and ventricular hæmorrhage causes rigidity.)

iii. Paralysis without loss of consciousness.

iv. Paralysis with hyperæsthesia.

v. Rigidity coming on after the return of perception and volition.

4. The after symptoms. There is not the sudden disappearance of morbid phenomena observed in congestion: nor is there the gradual improvement which takes place in hæmorrhage. Most commonly, the mental state persists as one of enfeeblement: the motorial phenomena remain: slight apoplectic seizures recur; convulsive movement and rigidity increase; and some little febrile excitement is set up.

(The extrinsic symptoms are unimportant, except so far as their negative evidence excludes the idea of diathetic or systemic diseases.)

§ V. TUMOR OF THE BRAIN, OR MENINGES.

There is a general improbability of tumor (whatever may be its supposed nature) in a characteristic case of apoplexy. Its most common course differs widely from that of the apoplectic diseases: but occasionally its development is insidious up to a certain point; although precursory symptoms have presented, they have been unrecorded; and the case has the immediate features of an apoplectic seizure. This may occur with tumors of very different character, and upon their distinction some remarks are made in Chapter XIV.

The means of distinguishing tumor from other causes of apoplexy are found principally in the precursory symptoms.

1. Pain has commonly existed for some time, it has occasionally been severe, and has had a fixed locality.

2. There have been some modifications of the special senses; such as dimness of sight; dulness of hearing, &c.; and these changes have been limited to one side, and are generally persistent after having been once developed.

3. Some slight failures of motility, in an hemiplegic or para-

plegic form, may have existed for a long time, and have increased very gradually, and very insidiously.

4. Occasionally, convulsive attacks of variable intensity and extent may have been witnessed, and have been by no means understood.

5. The intellectual condition, and the general bodily health continue normal.

The attack itself may present little of any diagnostic value, resulting as it sometimes does from congestion, and sometimes from hæmorrhage: but sometimes it occurs in a manner (*i. e.*, by a mechanism) which we cannot explain; but probably through some convulsive agency, of which it is the result. Post mortem we find neither hæmorrhage nor marked congestion, and during life the paralysis and apoplectic symptoms have usually been limited in extent, and of feeble intensity.

It (tumor) is sometimes the cause of anomalous symptoms, the explanation of which may be impossible during life. Thus, a mass of tubercle impinging upon the brain substance has given rise to slight confusion of ideation and sensation as a very occasional thing, until suddenly the patient loses the power of one side, or one limb, with some sensation of numbness or tingling, but without any real loss of perception. This diminished motility persists; there is slight pain in the head; and after a few days or weeks a convulsive attack appears, or coma suddenly supervenes, and the patient dies. The attack of paralysis (though imperfect) comes under the head of apoplectic seizures, as I have formerly defined them (p. 64); but in the case described, although we might guess at the existence of tumor, it would be untrue to say that its diagnosis was possible.

The reader is again referred to Chapter XIV. for the special diagnosis of tumor.

§ VI. TUBERCULAR MENINGITIS.

In the adult tubercular meningitis assumes a quasi apoplectic form, sometimes as the commencement of cerebral symptoms, but more commonly as their second or third stage of development. The diagnosis turns upon two classes of symptoms,—

1. Extrinsic. The recognition of the tubercular diathesis (phthisis) is the most important; but besides this there is (as already noticed, pp. 76 and 79) a peculiarly irregular pulse; slight febrile excitement, with heat of head; and alternately pale and flushed face.

2. Intrinsic. The attack is generally preceded by,—

a. Prodromata, such as pain in the head, fixed to one spot; dulness of intellect; and expressionless face.

b. The attack is rarely very sudden or severe.

i. Mental. Coma is not profound, the patient may be roused by loud speaking, or any other kind of disturbance; he looks around in a stupid, sleepy manner, and then relapses into a state of quiescence.

ii. Sensorial. There is only slight hypæsthesia even of the paralysed limbs; occasionally there appears to be some intolerance of sensorial impressions generally; and I have found several patients complaining of spontaneous pain, or uncomfortable sensations in the extremities.

iii. Motorial. Paralysis is incomplete in degree, and limited in extent; being often exhibited by a peculiar slowness of movement. Clonic spasms and rigidity are frequent; the latter being variable (in the same patient, from hour to hour), both in locality and amount.

c. The proportion between the symptoms (imperfect coma, with rigidity and only partial paralysis), is sufficient to exclude the idea of hæmorrhage and congestion; but occasionally there is great resemblance to acute softening. The special mental characters, and the imperfect paralysis, together with the extrinsic (tubercular) symptoms, and the general progress of the case (its assimilation to that described in the preceding chapter, p. 77, &c.), will, however, commonly furnish a satisfactory basis of distinction.

§ VII. URINÆMIA, AND DIATHETIC CONDITIONS.

The "diathetic conditions" are intended to include Icterus and Diabetes, when they have so far affected the organic system generally, as to induce marked nervous symptoms. By far the most important is,—

A. URINÆMIA;—its most frequent causes being the various conditions known as "Morbus Brightii;" the special anatomical bases of which are different forms of diseased kidney. Whether the renal disease is the cause of the diathetic, or general and systemic change, or whether it is the result of a peculiar cachexia or cachæmia, it is not the object of this treatise to enquire; inasmuch as a solution of the question would neither affect, nor *à fortiori* assist, the diagnosis of urinæmic from those other forms of apoplectic disease which it most closely resembles.

Urinæmia may be induced by the retention and re-absorption of secreted urine; or by some peculiar, and by no means satisfactorily explained, condition accompanying pregnancy. Under these various circumstances of origin, the general symptoms may differ; but, in the main, the intrinsic nervous phenomena are the same. Attention will therefore be directed to the diagnosis of urinæmia, independently of any farther consideration of its mode of induction. Such diagnosis may be inferred from some intrinsic symptoms, but it is to be demonstrated by extrinsic.

1. Intrinsic, may be divided into two periods:—

a. Premonitory (or prodromata), sometimes absent altogether.

i. Mental. Drowsiness, heaviness, listlessness of manner, or despondency; with confusion of ideas, loss of memory, and some tendency to slight delirium during sleep, or when falling asleep.

ii. Sensorial. Anæsthesia of the special senses, especially of sight; transient amaurosis, partial in extent, and incomplete in degree; muscæ volitantes; tinnitus aurium; occasional deafness, &c.

iii. Motorial. Clonic contractions of the muscles, of variable intensity and locality; general sluggishness of movement, &c.; and often a peculiar slight stertor, even when the patient is awake: a less degree of that described hereafter.

b. The attack very commonly occurs with some epileptiform convulsions; but without any such phenomena there may arise marked apoplectic symptoms of somewhat peculiar character.

i. Mental. The patient lies in a comatose condition, often marked by stertor, and thus apparently profound (the mouth open, the eyes half closed, and the pupil variable); but if he is addressed loudly, he instantly starts, opens his eyes, may make some effort to answer a question, and even answers it correctly, but then almost instantly relapses into his stertorous sleep. The coma is, however, often much more profound than this, all perception and volition being apparently lost (*i.e.*, as purely intellectual acts), but still the patient starts at a loud noise, and for a moment the stertor ceases.* Sometimes the comatose condition is preceded or accompanied by mild delirium; which has (as Frerichs remarks)† a peculiar tendency to monotonous expression; the clinging to and repeating innumerable times one idea or word. It is certainly not infrequent, but cannot be considered either positively or negatively, pathognomonic.

ii. Sensorial. General sensibility is very rarely completely lost, but it may be defective in some parts. The special senses are often altered. Amaurosis is by no means uncommon: deafness is less frequent. Sensation is affected mainly in reference to perception (as a mental act): the patient starts when a noise is made, a limb is withdrawn if pinched, the iris acts upon exposure to light, although there is no evidence of ideation in reference to these impressions, and the movements are evidently involuntary in their character and mode of production.

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* This peculiar form of coma is often described as characteristic of narcotic poison, especially by opium; but I have observed it in the great majority of urinæmic cases which have fallen under my own notice. The urinous element (whatever it may be) in the blood acts probably in a somewhat similar manner. There is not, however, in all cases of urinæmia the notably contracted pupil that is observed in poisoning by opium. It is interesting to observe that the sensori-motor system appears to resemble, in its pathologic conditions, the spinal (or reflective) centre, rather than the cerebral (or intellectual). It is in a state of exalted rather than depressed activity, although both sensation and motion are severed from their purely cerebral relations (*i.e.*, from forming parts of perceptive and effective volition). There are several poisons which appear to act in a directly opposite manner upon cerebrum and spine (inducing at the same time coma and convulsions), but whether they contain different elements whose action is thus separated, as Dr. Walshe once suggested in a clinical lecture the poison of urinæmia might be, I leave for future researches to decide.

† Die Bright'sche Nierenkrankheit, &c., p. 88.

iii. Motorial. In the slighter degrees of coma, general voluntary movement may remain when the patient is roused: in other cases there is partial (volitional) paralysis. Avolitional movements occur with considerable frequency, in the form of clonic spasms, very generally distributed; rigidity, varying in locality and amount, sometimes being excessive, and much increased by movement of the limb; and in the form of epileptoid convulsions. Sensori-motility appears often in relative excess, and the irritability of the muscles to percussion is, in many cases, highly marked.

The stertor exhibits a peculiarity, first noticed by Dr. Addison.* It is not of low, guttural tone, but of much higher pitch, and appears to be caused by the mouth rather than the throat, either by some position of the tongue against the roof of the mouth or teeth, or by some movement of the arches of the palate, not like that causing ordinary stertor, from which (although its mechanism is obscure) it presents the most obvious difference. (In several obscure cases—*i. e.*, obscure from the fact of the patient's not having come under notice until cerebral symptoms had appeared, and consciousness was so far lost that little or no commemorative history could be obtained, and in which no œdema of the ankles was perceptible; this peculiarity of the respiratory stertor has at once awakened my suspicions; has led to an examination of the urine and the breath, and to the discovery in the former of albumen and fibrinous casts, and in the latter of an undue quantity of ammonia.) The peculiar muscular condition causing this stertor, I am disposed to consider as the result of spasm rather than paralysis, and the spasmodic contraction may be either of sensori-motor, simply reflex, or tonic origin, forming only one of many phenomena which indicate excessive or perverted conditions of those groups of motor action. This hypothesis is, of course, as unimportant as the fact of the difference is valuable.

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* Guy's Hospital Reports for 1839, No. VI.

2. The extrinsic symptoms afford demonstration of Bright's disease, or of retained urine. With regard to the former, it is not my intention to detail the diagnosis, except so far as it relates especially to the determination of urinæmia.

a. General. These are the signs of debility and cachexia: an anæmiated tint of skin, and impaired nutrition, often accompanied by vomiting of a peculiar fluid, pale yellow in colour, and exhaling ammonia, as shown by the contact of a glass stirrer with hydrochloric acid. Diarrhœa is not uncommon, and the evacuations sometimes have a character similar to that of the vomited fluid. The expired air, in many cases, contains an excess of ammonia, the presence of which may be demonstrated by hydrochloric acid held near the mouth. The ankles are commonly œdematous, the eyelids and sides of the face exhibit the same condition: but all œdema may have disappeared when the case falls under observation.

b. Local. The urine affords the most satisfactory evidence in three particulars.

i. The presence of albumen. In the immense majority this may be readily recognised; but it is by no means conclusive evidence (either negatively or positively). It is said that albumen is often present in the urine, passed within a few hours, after convulsive seizures, not associated with renal disease, and that it disappears in the course of a day or two. I have sought for this after repeated epileptic attacks, but have failed to discover it; however, the observations of others leave little doubt as to its correctness, and the source of fallacy which it may prove.

ii. Casts of tubuli uriniferi to be detected by the microscope.

iii. Diminution of urea, to be ascertained by chemical examination. The reader is referred to the treatise of Frerichs, or to that of Dr. Owen Rees, or to the last edition of "What to Observe" (published by "the London Medical Society of Observation"), for the methods to be employed in this inquiry.

In the urinæmia of pregnant and parturient women, the most common symptom is convulsion, and to this I shall return in Chapter IX. That which arises from the retention of secreted urine has its own special physical signs, upon which it would be out of place to dilate in this treatise.

B. ICTERIC DISEASE. In the majority of cases of jaundice, the head-symptoms are trifling; but sometimes they are severe, and this occurs most frequently when the affection is acute, and accompanied by fever. Delirium is usually present for some days, and is then followed by gradually deepening coma. In a case recorded by Andral,* the coma resembled that of urinæmia, in having the characters already described (p. 109); in three other cases it is mentioned that the patient could be roused, and made attempts to answer.

The jaundiced tint of skin is the ground for diagnosis.

C. DIABETES MELLITUS. There is nothing special to be said with regard to the occurrence of apoplexy in the diabetic patient. His wan, pinched, and wasted look, voracious appetite, inordinate thirst, emaciation, copious micturition, and saccharine urine furnish the means for diagnosis.

§ VIII. MORBUS CORDIS, ANÆMIA, AND VASCULAR OBSTRUCTIONS.

These three causes of apoplectic symptoms have been grouped together from the fact of their presenting in common some changes in the blood as respects the conditions of supply, and from a generic similitude of their phenomena. Very few words will suffice to make apparent the diagnosis of such conditions, so far as it has been yet established.

A. MORBUS CORDIS. Hypertrophy of the left ventricle has been commonly thought to hold some causative relation with cerebral hæmorrhage; but the bases upon which this idea has rested are insufficient and unsatisfactory. It is now probable, as Dr. Walshe has suggested,† that coetaneous fatty degeneration of the heart, and cerebral vessels is the real link between this form of apoplexy and morbus cordis. Hypertrophous heart, however, not unfrequently occasions attacks of cerebral congestion (having the symptoms already described, p. 92); and this mode of causation should exercise its proper influence upon the treatment. It is not to these forms of so-called cardiac apoplexy that attention is directed now, but to that which assumes a syncopal character, the diagnostic features being pallor of the countenance and surface generally, with imperceptible radial pulse, and often imperceptible action of the heart. Arising sometimes from valvular disease, sometimes from depraved nutrition, and more frequently from dynamic changes (such as irregular, imperfect, or painful action) the recognition of a cardiac cause depends upon the previous diagnosis, or the present signs of such heart-diseases. The apoplectic symptoms are general in their distribution; resembling in this respect the congestive form of apoplexy, alike dependent upon a morbid condition (though a generically different condition), in respect of the supply of blood.

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* Clinique Médicale, tome iv., p. 272.

† Diseases of the Lungs and Heart. Ed. 1st—p. 471; and also Clinical Lectures (in *Lancet*), p. 279.

B. ANÆMIA. Owing to any sudden exertion, mental excitement, or moral emotion, an anæmiated person may lose consciousness and voluntary power, and for a few moments, or even for a longer time, appear in an apoplectic condition. The urinæmic coma, and some cases of cerebral hæmorrhage, present marked pallor of the surface, and, as the preceding section shows, morbus cordis may be attended with syncopal apoplexy. From these conditions, simple anæmic apoplexy may be distinguished by,—

1. The peculiar tint of skin, and mucous membrane (the latter being examined in the mouth and conjunctivæ) differing somewhat from that of urinæmia.

2. The absence of previous history, or the present signs of Bright's disease or of cardiac affection.

3. The very feeble pulse (less marked than that of urinæmia, or cerebral hæmorrhage in a weakened subject, but much more distinct than the pulse of an individual in a state of cardiac syncope).

4. The general distribution of the apoplectic symptoms.

5. The evidences of anæmia, in cardiac murmur, and in the arterial and venous trunks.

C. Vascular Obstructions. Apoplectic symptoms occasionally arise, assume the form of softening, and prove fatal in persons who have been the subjects of valvular disease of the heart. It has been shown, post mortem, that "vegetations" fringe the valves of the heart, that a vessel of the brain appears more or less obstructed by a fibrinoid body, resembling these growths upon the valves; and that softening of the brain exists in that portion to which this vessel is distributed. The inference has been drawn,—that a vegetation (or part of a vegetation) has become detached from the valves; that it has travelled through such large vessels as would allow of its passage; but that having reached a small cerebral artery it has been detained, in consequence of the diminished calibre of the latter; that it has more or less obstructed the current of blood; and has then caused softening of the brain by simple innutrition.*

The diagnosis of such a case would be very difficult; only an approximation to probability could be arrived at from the occurrence of symptoms in a person known to be the subject of valvular disease.

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* My friend, Dr. Saukey (of Hanwell), directed my attention, some weeks since, to the occurrence of oat-like masses of fibrinoid, atheromatous matter in the cerebral arteries of a man who had died of softening, but without any valvular disease of the heart. These deposits, which were very numerous, appeared to be on the free, inner surface of the lining membrane of the vessels, and were detached with great readiness by the finger-nail, or by simply dividing the vessel longitudinally, and rendering its inner surface convex. Dr. Saukey remarked that he had frequently observed them in other cases, where the vessels of the brain were much diseased; and that they often presented a greater resemblance than those which we were at the time examining to detached vegetations. It is therefore necessary that this source of fallacy should be excluded from the interpretation of cases presenting analogous conditions.

CHAPTER VIII.

DISEASES MARKED BY DELIRIUM.

THE essential elements of delirium, and the general character of those diseases which this chapter is intended to include, have been already described (see Chapters II. and V.). It is therefore unnecessary to dilate upon them here; and the only point to which allusion need be made again is, that, for the placing of any disease in this category, it is important that fever should be absent; or that it should be present in such degree only as will not account for the delirium.

The diseases to be diagnosticated are the following:—

I. Hyperæmia of the brain and meninges.
II. Partial cerebritis, or red softening.
III. Delirium tremens.
IV. Extrinsic diseases, including,
  Urinæmia, icterus, diabetes.

§ I. HYPERÆMIA CEREBRI.

It would, *à priori*, appear probable that the functional activity of an organ, bearing direct relation to the interstitial changes which it undergoes (from the contact and intussusception of blood, and its own disintegration), should be in proportion to the quantity of fluid circulating through it; and this supposition is in the main correct. There are, however, other conditions (besides those of mere quantity) which influence the activity of function: and these we are by no means able to explain satisfactorily. There are abundant reasons for thinking that both the quality of the blood, and the rapidity of its movement, are highly influential; but the precise conditions of variation in respect of those properties are unknown. Post mortem, we find evidences of increased vascularity, when during life there have been either apoplectic phenomena or the signs of delirium; and it may be that in the former case there has been increased quantity of blood, with interruption or impediment to its movement: whilst, in the latter, the augmented quantity has been accompanied by normal, or even exaggerated, force and rapidity of its circulation.

Delirium, uncomplicated with other nervous phenomena, occurs most frequently in persons of advanced age. It is not, however, confined to this period of life; being present sometimes in the child or adult, and this commonly after exhausting diseases, more or less dependent upon blood-changes, such as rheumatism, &c., in persons of delicate constitution. There are two degrees of the affection: in the first, speech only is affected; in the second, action. The diagnosis of a simply hyperæmic cause is founded upon:—

1. The mode of attack. It is commonly somewhat sudden and unexpected: may be induced by a fall, or by fright; but, when occurring spontaneously, is first observed at night.

2. The character of the delirium. It is sometimes preceded by depression of spirits, rapidly passing into that of alarm, or of great and very unnatural hilarity; loud talking, laughing, &c., with a wild or simply animated expression of countenance. In old people, the first symptom often is, getting out of bed at night, and the patient (in hospitals, &c.) walking about the wards, and attempting to get into the beds of the other patients. Short of this, however, there may be merely nonsensical talking. It is very rare for violent excitement to be present; although, in some cases, alternate laughing and crying may present a certain resemblance to hysteria. More commonly the patient is employed for hours or days together (*i.e.*, at the return of the delirium) in arranging the bedclothes, or his dress; or in catching (gently) at imaginary objects.

3. The simplicity of the delirium—*i.e.*, its freedom from complication with other intrinsic nervous symptoms. This is the rule; but there are some exceptions, the presence of certain:—

4. Other intrinsic symptoms, such as:—

a. Mental. Loss of memory; and, after the attack of delirium, confusion of thought, with failure of intellectual power; but then very slightly marked, and of temporary duration only.

b. Sensorial. Pain in the head, which sometimes precedes and accompanies the delirium, in conjunction with general sensorial disturbance, such as tingling sensations, numbness, &c. False sensations, of subjective origin, appear common, the patient talking to, and grasping at imaginary objects.

c. Motorial. Sometimes there is spasmodic contraction, sometimes paralysis; but they commonly assume a general, or variable distribution. The delirium has sometimes been preceded by attacks of quasi-apoplectic character, having their origin in congestion. (See p. 92 for symptoms.)

5. Extrinsic symptoms. Vomiting occurs sometimes; but it is rare. Durand Fardel remarks, that it is common to find "a mucous secretion, clear and viscid, produced on the eyelids, or in the interior of the mouth, and sometimes in extraordinary abundance, running over the whole face."* This is not peculiar to simple congestion, but is found in old people with softening, &c., into whose symptoms congestion enters as one causative element.

§ II. ACUTE SOFTENING.

As with the apoplectic form, so is it with that characterised by delirium, the symptoms of softening bear a close resemblance to (because partly consisting of) those of congestion. For some little time it may be impossible to affirm with accuracy the existence of more than the latter; but the course of symptoms renders a diagnosis possible. In some cases, the nature of the case may be made out from the first.

1. Precursory phenomena. Enfeebled intelligence, motor, and sensory changes, especially when either of the latter two have been observed only, or principally in one side of the body, indicates the existence of something more than simple hyperæmia; and the limitation of the symptoms (in respect of locality) announces a probability of softening, in direct propor-

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* Maladies des Vieillards, p. 27.

tion to the length of time during which they have been developed.

2. The developed symptoms.

a. Mental. Delirium is mild and inoffensive; very different from that of meningitis (and in those few cases marked by considerable excitement, it is probable that some limited meningitis exists). In the intervals of delirium there is distinct mental weakness, loss of memory, confusion of ideas, &c.

b. & *c.* Sensorial and Motorial;—are the signs of paralysis and anæsthesia of variable intensity, limited to one side, and sometimes accompanied by pain and rigidity in the limbs affected.

3. The after-symptoms. That which characterises softening is the persistence of diminished intellect, motility, and sensibility, when the delirium has passed away. (See p. 102 *et seq.*)

§ III. DELIRIUM TREMENS.

This disease may have its main features, as expressed by its name, accompanied by two different groups or classes of organic conditions. In the one, there is more or less vascular excitement; in the other, the reverse. The first form is likely to be confounded with meningitis, or acute mania; the second is not liable to be mistaken for any other disease. We cannot, however, from the occurrence of the latter, assert (as is sometimes done) the previous abuse of alcoholic stimulus; delirium tremens may arise from the introduction of other poisonous matters, and also from venereal excesses.

1. Precursory history will, however, in many cases, establish a diagnosis which might, in the absence of such knowledge, be open to doubt.

a. The conditions which precede the attack are most commonly one or more of the following:—

i. Sudden discontinuance, or diminution of the habitual stimulus; and this whether occurring from a spontaneous (volitional) resolution, or from circumstances over which the patient has no control, such as an accident, placing him under restrictions imposed from without.

ii. Great excess of drinking, in an habitual "tippler," or in a person whose habits have been very moderate.

iii. Habitual, long-continued "tippling," or taking too much stimulus, without the occurrence of complete intoxication.

iv. Moderate drinking, with great privation of food.

v. The habitual or occasional employment of opium, or stramonium, or other narcotic drugs; or the sudden discontinuance of such habits.

vi. Venereal excesses in young and weakened subjects.

b. Extrinsic symptoms. It will depend upon the nature of the preceding conditions whether or not we should seek for other precursory symptoms, which, although presented by the habitually excessive drinker, are to be found in by no means every case of delirium tremens. Those which are most common are,—feverishness, with foul, furred tongue; thirst and anorexia, clammy perspiration, irregular and suspirious respirations, with frequent but soft pulse.

c. The intrinsic symptoms resolve themselves into,—

i. Mental. Dejection, melancholy, restlessness, with disturbed sleep, and irritability of temper, or some change in the manner of the individual, very variable in its character.

ii. Sensorial. Præcordial oppression, vertigo, nausea.

iii. Motorial. Tremulousness of the limbs and tongue, loss of muscular power generally, with cramps in the extremities.

All these precursory symptoms may have existed for a long or a short time: they are usually of less duration in young subjects than in those of advanced age. They are especially noticed in the morning, and for weeks may disappear daily, as soon as the habitual stimulus is taken.

2. Developed symptoms, which may be presented almost immediately after a debauch, or after a precursory stage.

a. The extrinsic are merely an exaggeration of those already described; in some cases assuming a sthenic form, with vascular excitement, dry, red tongue, and heat of surface. (See Chapter VI., p. 88.) But much more commonly the patient is in a notably asthenic condition, with moist, foul tongue; clammy, tenacious, fetid perspiration, and cool surface; small, feeble pulse; dark and fetid evacuations, or constipation; and nausea, with total anorexia.

b. The intrinsic symptoms are pathognomonic.

i. Mental. There is extreme confusion of thought, accompanied by delusions, generally of frightful character. These appear to be pure creations of the disordered mind; the patient filling a perfectly vacant room with all kinds of imaginary objects of horror and torment; screaming at them, or attempting to hide himself from them by the bed-clothes, but finding them then in even closer proximity to himself. His aspect is that of terror and mistrust; he is suspicious of every one around him; but may generally be soothed and comforted by kind but firm assurance. The delusions are rarely of the fixed character observed in mania; the patient does not reason about them, he cannot command his thoughts as the insane man often can; he is wandering involuntarily amid fanciful but frightful creations of his own perverted mind, rather than, with disordered will, bending all his powers to appreciate and corroborate the truth of his delusion. Generally the patient is tractable; but, if violently contradicted or thwarted, may become sullen and malicious. There is perfect insomnia, so that the unfortunate sufferer finds no relief; and his power of realizing the falsity of these tormenting impressions diminishes as the case advances.

Besides these mental creations, there are false perceptions (from sensation). The objects of the room appear distorted and hideous, generally into some form corresponding with the delusive ideas. The delirium in fatal cases (of non-febrile type) becomes of low, muttering character; the patient sinks into coma, not lasting for many hours, and he dies in a comatose condition. (See Chapter VI., p. 89, for the diagnosis of cases marked by excitement, &c.)

ii. Sensorial. Pain in the head is not complained of when delirium tremens is uncomplicated. Although pseudæsthesiæ (see p. 31) are common (*i.e.*, there are subjective sensations and false perceptions), there are no marked dysæsthesiæ (see p. 30), or any true hyperæsthesiæ. When the two latter occur, there is pro tanto reason to suspect meningitis; and then there is injected conjunctiva, flushed cheek, &c. (see p. 72.)

iii. Motorial. The characteristic phenomenon is the tremor; and this, though noticeable when the patient is lying still, becomes much more so when the limbs are extended, or the tongue is protruded. In the sthenic form, convulsions occur, and are followed by stertorous coma: in the asthenic (more common) type, subsultus tendinum, and a comatose condition come on; and convulsions of general extent are extremely rare, except in articulo mortis.

The characteristic symptoms of this disease, are;—delirium of fearful, wandering, but tractable type, with delusions; a peculiar muscular tremor, wakefulness, a non-febrile state with clammy, cool skin, and disordered offensive secretions.

§ IV. DIATHETIC DISEASES.

Those which may sometimes be confounded with other diseases are, urinæmia, icterus, and diabetes. The diagnosis in each instance is to be founded upon extrinsic symptoms, and upon the special characters of the intrinsic. (See p. 107.)

The delirium is commonly mild, and "low-muttering" in its character, attended by subsultus tendinum, or clonic spasms.

CHAPTER IX.

DISEASES MARKED BY CONVULSIONS.

We enter now upon the consideration of a class of diseases replete with pathological interest, social importance, and clinical difficulty. The confessedly great obscurity of convulsive affections induces some diffidence of the attempt which I have made for their classification and diagnosis. It is not my intention to enter upon the many inviting questions which their pathology proposes for solution, further than to say, that, although it is questionable whether the phenomena under consideration should be referred directly to morbid processes in the brain alone, there are many diseases which leave post mortem changes discoverable only in that organ, and of these diseases convulsions form a prominent feature during life. Whether, therefore, the relation between convulsive phenomena and a cerebral lesion is direct and necessary, differing not only in degree, but in kind, from that which subsists between the former and any morbid organic condition of other parts of the body; or whether the cerebral lesion acts only in the same manner as (*i.e.*, does not differ in kind, although it may in degree from) eccentric irritations; or, in other words, whether the phenomena of convulsion are dependent directly upon the cerebral state, or are the result of some coetaneously (dependently or independently) induced condition of another portion of the nervous system, are questions beside the object I have in view: since there are acute diseases of the encephalon, of which convulsions are the most striking symptoms; and these diseases may often be diagnosticated from each other, and from those of demonstrably eccentric origin, by the precursory conditions, intensity, special character, distribution, and sequelæ of the convulsive paroxysms.

The primary division of convulsive diseases is into those of centric (intrinsic) and those of eccentric (extrinsic) origin: and with regard to this division, or its diagnosis, one general remark is important; viz., that inasmuch as the physiological peculiarities of childhood afford a greater proclivity than do those of adult age to the occurrence of convulsions from extrinsic as well as intrinsic causes, the probability is greater that they are of eccentric origin in the child than in the adult, and *vice versâ*.

The following conditions and diseases may be diagnosticated:—

A. Convulsive diseases, of extrinsic origin (eccentric).

I. Blood diseases, or toxæmiæ.

1. Introduced poisons, including the acute specific diseases, the exanthemata, mineral poisons, &c.

2. Retained poisons, or excreta, such as urinæmia, icterus, rheumatism (?), &c.

II. Eccentric irritations (not toxæmiæ).

1. Gastro-intestinal. Dentition, dyspepsia, worms, constipation, &c.
2. Bronchio-pulmonary. Laryngismus, pertussis, &c.
3. Genito-urinary. Morbid uterine conditions, calculoid affections, &c.

B. Convulsive diseases of intrinsic origin (centric).

III. Idiopathic, without assignable static cause.
IV. Congestion of the brain, and meninges.
V. Softening of the brain (local acute cerebritis).
VI. Tubercular meningitis.
VII. Tubercle and tumor of the brain.
VIII. Cerebral hæmorrhage.
IX. Cerebral hypertrophy.
X. Acute chorea.

A. CONVULSIONS OF ECCENTRIC ORIGIN, OR EXTRINSIC.

§ I. BLOOD DISEASES (TOXÆMIÆ).

1. *Acute specific diseases.* It is of the greatest importance to discover this cause when it exists; to exclude it from consideration when it does not. In the adult, convulsions rarely arise from the acute febrile diseases; but in the child, under six years of age, they are of frequent occurrence, and may be present before any marked symptom of a specific fever is apparent. In Chap. VI. p. 87, the occasional presentation of convulsions, in continued fever, has been alluded to; and it is not to paroxysms appearing in that manner, or at so late a period of disease, that attention is now directed, but to the convulsive attacks which sometimes usher in febrile affections in childhood; taking the place of, and not exceeding much in importance, initial rigors in the adult.

The prognostic importance of convulsions at the onset of fever in a child is very little; but after ten or fourteen days it is very great, and is eminently unfavourable. The diagnosis in the latter case is easy; in the former it is often difficult, and it is to the former that we are now attending. It is upon the following points that the diagnosis will turn:—

i. The child is under six years of age, and has previously been in general, or habitual, good health.

ii. There is no hereditary predisposition to tubercle, convulsions, or insanity.

iii. There has been no distinct occasional cause, such as "fright," exposure to the sun, a fall, the exhibition of narcotic drugs, &c. &c.

iv. There have been no previous indications of head-affections.

v. No irritation can be discovered in any organ. (Dentition, worms, overloaded stomach, or constipated bowels.)

vi. There has been no complaint of pain in any region.

vii. Some general malaise, loss of appetite, restlessness, or feverishness, may have been present for a few days or hours.

viii. Some exanthemata are prevalent in the house, or neighbourhood, or even on the child itself (for this has been overlooked).

ix. It has been exposed to infection.

x. The convulsions have not recurred frequently, nor have they been very severe, nor followed by deep coma.

xi. Between the attacks there is no paralysis nor rigidity.

xii. The child has not been vaccinated, or has not yet had all the ordinary exanthemata, particularly scarlet fever, and measles.

Under these circumstances, the probability would be very great, that the convulsions were due to the presence of an acute specific disease in its initiative stage: at all events the suspicion might be entertained so strongly that sufficient time should be allowed to pass, before taking active measures, for the disease to reveal itself by appropriate symptoms, or for further phenomena to correct the erroneous judgment.

It is not until this source of convulsions is excluded from the diagnosis that we can fairly enter upon a consideration of:—

2. *Toxæmiæ from retained excreta;* such as urinæmia, icterus,

&c. The diagnosis of these conditions is based upon the recognition of their extrinsic symptoms; and certain peculiarities of the intrinsic, when any of these have occurred in the form of prodromata.

a. Urinæmia, when occurring in conjunction with acute disease of the kidney, coming on after scarlet fever, or during its period of desquamation, has so distinctive a group of symptoms that it cannot readily be mistaken for other affections: but when occcurring in the course of chronic Morbus Brightii; appearing as the sequela of typhoid, or cholera; or as an accompaniment of pregnancy, there may be some surprise felt at the first occurrence of convulsions, and there is difficulty of diagnosis until the extrinsic origin has been established.

In all these cases the preceding drowsiness and listlessness, with the organic condition of the patient, and the form of coma (described p. 109) which is presented, awaken suspicions; and an examination into the extrinsic features of the case rarely fails to establish a diagnosis of its true nature.

b. Icterus, is at once recognised by its peculiar modification in the tint of skin, conjunctivæ, and secretions.

c. Rheumatism. The articular condition; the general febrile state; and the peculiar mental excitement, with clonic spasm, &c. (see p. 80), indicate the existence of this cause. In an obscure case, perhaps, unmarked by any articular affection (though pain in the limbs is complained of) the heart should be carefully examined, as percarditis may be the first local development of rheumatism.

If none of these conditions is discoverable, there is another class of extrinsic causes (eccentric irritations) to which the convulsions may be due; and sometimes the two kinds of causation co-exist, and this possibility must be remembered.

§ II. ECCENTRIC IRRITATION.

MM. Barthez et Rilliet group together convulsions of this character, which they term "sympathetic," with others which they denominate "primary" or "idiopathic,"* because they present this fact in common, that they are not "symptomatic" of any discoverable lesion in the nervous centres. It is, doubtless, of great importance to know whether or not the symptoms in question indicate the existence of centric disease; and for this very reason it appears to me injudicious to place in the same category sympathetic and idiopathic convulsions; since the name of each indicates that the latter depends upon centric, and the former upon eccentric causes. During childhood there is greater relative activity of avolitional motility, and less of volitional than in after life; and this relation, *per se*, is a predisponent to convulsions. When, therefore, an intense eccentric irritation is followed by an attack, we do not necessarily infer the existence of any morbid condition: but when convulsions occur apart from such irritations, or as the sequence of such occasional disturbances as other children are subjected to without any ill effect, we must infer that there is some abnormal condition of the centric organs, in the case under consideration. Although post mortem examination can reveal no static (anatomical) change, the simple fact of convulsion is proof of dynamic (functional) disease. It may be simply an exaggeration of avolitional motility, the limited preponderance of which is natural to this period of life, and which is doubtless designed to accomplish, and in the majority of instances does accomplish important ends.

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* Traité clin. et prat. des Maladies des Enfants. Tome ii., p. 270, &c.

The convulsion in the former case may be but the normal reaction of the nervous system upon abnormal stimuli: in the latter it is the consequence of abnormal reaction upon normal stimuli. The distinction is not one of words, or of pathologic speculation only; but it is of the utmost clinical importance in respect of treatment; and hence it appears to me very desirable that the diagnosis of the two conditions should be satisfactorily made out. This may generally be accomplished by attention to,—

a. The precursory symptoms and conditions.

1. Age. The child has not exceeded its sixth or seventh year.

2. Habitual health, has been good; and especially, there

have been no signs of undue spinal activity (see p. 36), which will be noticed under the next section, nor have there been indications of cerebral disease.

3. Management, has been generally judicious, in respect of sleep, diet, &c. (considered quantitatively and qualitatively).

4. Hereditary predisposition to disease is absent.

5. There has been no exposure to infection.

b. The immediate precursors of the attack,—

1. Some general indisposition, of not very marked character, or,—

2. Distinctly developed disease, of,—

a. Gastro-intestinal organs; such as dentition irritations, an overloaded stomach, ascarides, lumbrici, constipation, muco-enterite, &c.

β. Bronchio-pulmonary; *e. g.*, pertussis, pneumonia, pleuritis, bronchitis, laryngitis, croup, &c. &c.

γ. Genito-urinary. Uterine disturbances, calculus in kidney or bladder, &c. &c.

3. Exposure to direct nervous disturbance, such as fright, the rays of the sun, a fall, &c. &c.

c. Phenomena of the convulsive seizure.

1. Perception and general sensibility are rarely completely lost: in the exceptional cases it is only during the extreme intensity of the paroxysm.

2. The attacks are rarely repeated. Although there are exceptions to this rule, it expresses the general truth as recorded by Brachet,* and MM. Barthez et Rilliet.

3. The attack is commonly of short duration.

4. After the paroxysm, there are no evidences of centric disease, such as prolonged and profound coma, or paralyses, &c.

When the circumstances detailed exist in combination, there is strong probability that the convulsions are sympathetic in origin; *i.e.*, that they depend upon some excess of irritation rather than excessive irritability. In doubtful cases, the diagnosis must be postponed; but when none of the characteristics mentioned above can be discovered, there is reason to fear that the disease is idiopathic (and dynamic), or that it may be symptomatic of some cerebral lesion. The diagnosis of these two classes and the differentiation of the several elements of the latter, form the next topics for consideration.

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* Traité des Convulsions dans l'Enfance.

B. CONVULSIVE DISEASES OF CENTRIC ORIGIN, OR INTRINSIC.

§ III. IDIOPATHIC, OR DYNAMIC.

Convulsions of centric origin occur without the detection, post mortem, of any structural disease. It cannot be positively asserted that none exists; but, until it is shown to be present, we are justified in using the word dynamic. (See Appendix B.)

The group of idiopathic convulsion takes an intermediate position between those of eccentric, and those of centric (static) origin. Its diagnosis is arrived at per viam exclusionis, or by negative, and also by positive characters: the bases of distinction being:—

A. The absence of any evidence of eccentric irritation.

B. The absence of diathetic diseases.

C. The absence of any distinct symptoms of organic (nervous) lesion.

D. The presence of certain conditions and phenomena, which indicate a tendency to increased spinal activity (see p. 36).

E. The special characters of the attack.

It is unnecessary to make further comment upon A. B. and C., their value is great, but it is to be appreciated by negation only; and for the symptoms whose absence is to be ascertained, see pp. 36, 124. The other two classes of phenomena require further comment, in relation to,—

1. The precursory symptoms, these are found in the chapter upon Elements for Diagnosis, under the head of augmented reflex motility. Brachet has described, with great clearness, many of them, as they are presented in childhood;* but there is much doubt whether these may not often be dependent upon temporary eccentric irritation. These are grinding

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* Loc. cit., p. 31.

of the teeth, carpo-padal contractions, strabismus, starting spasmodic movement of the limbs, &c. MM. Barthez et Rilliet recognise, on the other hand, intellectual changes (*e. g.*, sleepiness, or irritability of temper) as among the prodromata.*

It is by the habitual occurrence of such phenomena, for days or weeks before the attack, and this independently of any distinct external cause, that we are led to infer the existence of an idiopathic morbid condition. There is nothing in either the negative or positive prodromata of idiopathic convulsions (rarely occurring except in early life) which distinguishes them from the first attack of epilepsy. The latter is essentially a chronic disease; and the nearer the patient has advanced towards puberty, the greater is the probability of its existence (or rather, the less is the probability of eclampsy). The difference between these two appears to be, that epilepsy presents not only a pathologic degree of the relationship between volitional, and avolitional motility, but one of greater intensity and persistence; inasmuch as it exists apart from the presence of any physiologic tendency of the same kind, because at a period of life which is normally exempt from such disturbance; and more than this, it assumes the chronic form. Normally, the child grows out of its convulsive tendencies, and the probability of eclampsy is at an end; but when epilepsy exists, as a chronic disease, it shows that the tendency persists, and the existence of such tendency after puberty is in itself pathologic.

2. Phenomena of the attack. The convulsions may be general or partial; but are usually of short duration; and they rarely return with any great frequency. The loss of perception is neither so marked nor so persistent as in epilepsy. The spasmodic movements are not so violent as those of symptomatic convulsions; and the general character is therefore that of medium intensity.

3. Sequelæ of the attack. There is some tendency to stupor, but it is not of severe character. There are no signs of paralysis affecting limited groups of muscles; the intellect is natural when the stupor has passed away; and there are no phenomena

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* Op. cit. tome ii., p. 268.

of extrinsic disease. The attacks do not return until some days or weeks have elapsed; and the same is true with regard to epilepsy. If, therefore, the convulsive phenomena are very severe, or if they rapidly return after a temporary cessation, there is reason to suspect the existence of something more than a dynamic cause.

§ IV. CONGESTION OF THE BRAIN AND MENINGES.

Congestion of the brain may be the cause of convulsions at any period of life; and when not the sole cause (or occasion of all the symptoms), it is usually one of the more marked phenomena, and may probably have very much to do with the disturbance of cerebral functions, such as the temporary profound coma, and the subsequent stupor.

Cerebral congestion as a primary event is not so apt to occur in early life, as in advanced age, or that period at which maturity is passed. As we have found its symptoms assuming an apoplectic and delirious form, and thus resembling for a time those which belong to hæmorrhage, and ramollissement; so we find the convulsive form of congestion, occurring under the same aspect as convulsions from those two diseases. The reason for this is evident in each case—viz., the part which congestion takes in the production of symptoms; the diagnosis of either hæmorrhage or softening being based upon the recognition of symptoms over and above those for which simple congestion will account.

The first point to be ascertained, is the absence of eccentric causes, whether of the toxæmic, or irritant character: and this having been established to examine—

1. The prodromata. These may be absent (which is very rare, except under circumstances of causation to be hereafter mentioned), or, what is more common, may be undiscoverable for a time, as the patient is unable to give any commemorative history of himself, and the symptoms are often so slight that they have not attracted the attention of friends. When the inquiry can be answered, however, it is found that there have been threatenings for a variable, but sometimes for a lengthened

period; and these have commonly assumed the form described in the section on congestive apoplexy—viz., general disturbance of the nervous centres, confusion of ideas, loss of memory, heaviness, vertigo, &c. &c., increased by the horizontal posture, stooping, &c., see p. 92. The symptoms premonitory of congestion (or which are caused by slight degrees of congestion), are not limited to particular portions of the body, but are general, or, at all events, variable in their situation; neither do they maintain a certain degree of intensity, nor present a progressive increase; but they are highly marked at one period, and at another are absent altogether.

2. The attack is commonly sudden; and is immediately preceded by some change of posture, violent effort, such as lifting heavy weights, &c.; or by some impeded return of blood from the head; for example, the tight cravat, or trachelismus.

During the attack, perception and volition are commonly completely lost for a variable, but rarely for a long time. The peculiar epileptic cry is absent (according to Durand Fardel.*) Convulsive movements affect the body generally or partially; and often one side more than the other when both are implicated. The facial muscles are involved: respiration is suspended for a few moments; then becomes laboured, and often stertorous: the pulse is irregular; and the extrinsic phenomena resemble those of epilepsy, except that they are commonly less marked. However, the face darkens, the patient foams at the mouth, the jugular veins are distended, and there is marked throbbing in the neck. It is rare for the attacks to be repeated at short intervals, and the stupor is less profound and persistent than that which occurs in epilepsy.

3. Sequelæ of the attack. There is dulness of intellect, cephalalgia, sometimes limited paralysis, but more frequently general muscular feebleness, or exhausted irritability; and these phenomena rapidly disappear, leaving the patient in his usual condition. There is not the distinctly limited and marked paralysis of ramollissement or hæmorrhage; and the absence of these signs, together with the rapid disappearance

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* Maladies des Vieillards, p. 30.,

of the symptoms generally furnish (as in apoplexy) the bases of diagnosis.

§ V. SOFTENING OF THE BRAIN.

Although some amount of convulsion may accompany the progress of softening, when its symptomatic character is in the main apoplectic, the diagnosis of softening under such circumstances turns upon the points alluded to in Chapter VII. p. 102 *et seq.*, and this class of cases is not referred to now. Convulsions occur in the course of chronic softening, but neither are they alluded to in the present instance. A consideration of their characters will be found in Chapter XIV.

There is another class of which convulsions form the prominent feature, and often the earliest indication of disease, and it is to this class that attention is directed.

1. Preliminary symptoms. These have usually been present in the form described at p. 103, as the prodromata of softening when its symptoms have an apoplectic type. The most important are pain in the head, mental decay, and some limited impairment of motor power. In conjunction with such signs of disease, it is not uncommon for the patient to have presented transient and slight convulsive attacks, resembling "le petit mal," of the French authors. (For the characters of "le petit mal," see Epilepsy.)

2. The attack may be very sudden and unforewarned, or there may be some immediately preceding symptoms, such as vertigo, or other modified sensations of no very definite character or diagnostic value. The convulsions are usually epileptiform or epileptoid (see p. 44), that is, they pass through stages, and present general features having a resemblance to the developed paroxysms of epilepsy. The spasmodic movements may be limited to one side, or they may be much more marked on one side than on the other. They may be extremely violent and quasi-tetanic; or they may be very feebly marked, consisting in simple tremor of the limbs.

3. Sequelæ of the attacks. The convulsive seizure having passed away, some of the muscles which were previously con-

tracting clonically are found to be paralysed, or in a state of rigidity. Sometimes the paralysis is found in the limbs of that side which was the most convulsed, sometimes in those of the other.

a. Mental. There is not the marked stupor of epilepsy, but the mind is obscured; perception is diminished; the ideas are confused; and memory much impaired. There is a marked difference from congestion, not only in the degree, but the persistence of these symptoms; always an important aid in the separation of static from dynamic diseases.

b. Sensorial. Cephalalgia, pain in the limbs, with implication of general sensibility, accompanying paralysis.

c. Motorial. Paralysis, limited in extent, but marked in degree, and accompanied by clonic contractions or rigidity.

It is thus the occurrence of symptoms besides those of convulsion, and over and above those for which congestion will account, that gives rise to the suspicion of softening. It is very important, however, to exclude the existence of urinæmia, which may prove a source of fallacy; and the age of the patient may afford some assistance in the diagnosis, softening being most frequent after the middle period of life, whereas epilepsy and meningitis very rarely commence except at an earlier age.

§ VI. TUBERCULAR MENINGITIS.

It is in the child especially that tubercular meningitis sometimes assumes the convulsive form (*i. e.*, that convulsions become its most marked characteristics); but the disease may (as stated p. 79), commence by convulsions in the adult. Under either condition in respect of age, the diagnosis may be subsequently established by the general course of the affection, the proportion between its symptoms, and by the extrinsic signs of a tuberculous diathesis. This is, however, much more frequently the case in the adult than in the child; some difficulties occur with regard to the latter which require separate consideration.

1. Precursory phenomena, &c. It is commonly stated that

convulsions, when symptomatic of cerebral disease in the child, are rarely present at its commencement. Perhaps, speaking rigorously, this is correct; but the premonitory symptoms are so slight, so general, and so vague in many cases, that they are often neglected altogether, or considered as something distinct from the cerebral affection. MM. Barthez et Rilliet give the following statistical resumé of their observations upon this point:—

Of sixty cases of convulsion, thirty-five were symptomatic, and twenty-five were sympathetic. In sixteen of the former, convulsions were the first symptoms which occurred. ("Qui a marqué le début de la maladie cérébral.") Among the latter, convulsions took place at the onset in four only.* Thus, it appears that we must not exclude the idea of cerebral disease, because there have been no premonitory symptoms referring to the brain; neither must we exclude the idea of tubercular meningitis, because the convulsions have occurred in a child whose previous health has been good.

More commonly, however, there are distinct evidences of impaired health; there may be the hereditary predisposition to tubercle, discoverable in the parents; or, when this cannot be readily detected, the congenital tendency may be inferred from a demonstrable scrofulous diathesis in other children of the same family. (For the more distinctive prodromata, see Chap. VI. p. 75.)

2. The attacks are commonly severe, individually prolonged, and repeated frequently, and with short intervals. The extent of convulsion is very variable.

3. Sequelæ. These are,—marked coma, paralysis, clonic spasms, occasional delirium, some febrile reaction, &c. &c., the characters described in Chapter VI. pp. 76, 77.

To resume—The diagnosis depends upon the recognition of:—

a. The tuberculous diathesis, together with—
b. Repeated, and severe convulsions; followed by—
c. Coma, and paralyses.

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* Maladies des Enfants, tome ii., p. 272.

§ VII. TUBERCLE AND TUMOR OF BRAIN.

A. Tubercle of the Brain in Children. This is the most frequent form of tumor, giving rise to a distinctly (*i.e.*, prominently) convulsive disease.

1. Premonitory symptoms are both extrinsic and intrinsic.

a. The extrinsic resolve themselves into those of the scrofulous diathesis; with some general derangement, vomiting, &c., which may exist for several days or weeks, or which may be absent altogether.

b. The intrinsic may be absent (*i.e.*, convulsions may be the first indication of cerebral disease); or there may be for a variable period,—

i. Mental. Weakness, irritability of temper, &c.

ii. Sensorial. Severe, lancinating pain in the head, often assuming an intermittent or paroxysmal form.

iii. Motorial. Strabismus, loss of power in a limb, &c.

2. The attack is usually epileptiform in character; severe, long-continued, general in extent, not repeated frequently, nor after short intervals. The attacks are four or five in number; and the seat of convulsion bears no constant relation to the locality of tubercle.

3. Sequelæ. Coma and death may follow immediately. In other cases there are the following symptoms:—

i. Mental. Intelligence (perception) may be preserved throughout, but more commonly it is lost during the attack. Afterwards, it is not much affected; delirium is rare, coma is rare also; the most common change is in the temper and disposition; there is a peculiar sadness, with frequent moaning.

ii. Sensorial. There is severe cephalalgia, with some impairment of the special senses; such as blindness or deafness of one or both sides.

iii. Motorial. The most marked phenomena are (volitional) muscular weakness, or rigidity in the limbs which have been convulsed. When contraction is observed, the brain substance around the tubercle is found softened (Barthez and Rilliet, p. 560). Paralyses of limited extent and intensity are common: sometimes paraplegia has been observed, and in these cases the cerebellum is commonly the locality of deposit. Tubercle of the cerebellum occurs, however, without paraplegia, and *vice versâ*.

B. *Tumor of the Brain* (non-tuberculous) rarely assumes a prominently convulsive form of symptoms, except in early life. When occurring in childhood, there is nothing by which its intrinsic symptoms may be made the means of diagnosis from tubercle; and the probability of tubercle is arrived at by our knowledge of its much greater frequency (than any other form of cerebral tumor) in early life: and by the extrinsic signs of the scrofulous diathesis.

The diagnosis of tumor generally, in the adult, will form the topic of special consideration hereafter (see Chap. XIV., § III., Tumor); and such convulsive phenomena, as may occur, will be found enumerated there, and their value in respect of diagnosis pointed out.

§ VIII. HÆMORRHAGE.

Under certain circumstances which cannot, in the present state of medical science, be explained by the physical conditions discovered post mortem, hæmorrhage is marked by convulsion as its most prominent symptom during life. This is rare; but it may occur at any age, although, as we might expect from the physiological tendencies of the period, it is more common during childhood. The symptoms of hæmorrhage are more varied in early life than in any subsequent period, and cases sometimes occur in which a diagnosis is impossible.

A. *In the Child*, some suspicion of hæmorrhage might be entertained, if it was known that repeated attacks of congestion had been present as premonitory symptoms, or that there had been recent exposure to the sun's rays. The convulsions are commonly long-continued, severe, and frequently repeated; and may be followed by well marked limited paralysis and coma. Yet it would be extremely difficult to separate such a case from that of tuberculous disease, especially

have encountered it in each of the four preceding chapters. As an acute affection, it does not exist alone, and as a chronic disease it will be found in Chap. XII., § III., Hemicrania.

The modifications of sensibility arising from its excess have diagnostic value of a subordinate character only, and hence do not form the prominent features of any well marked group of acute diseases. Neuralgiæ are for the most part chronic, and do not therefore come under consideration now; but, besides this reason, there is the fact of their frequent dependence upon local (and not central) causes; upon disease of the nerve trunks, and not upon lesion of the brain. The extent and limitation of neuralgiæ, and their relation to particular branches, or trunks of nerves, indicate their peripheral origin.

Cephalalgia accompanies extrinsic as well as intrinsic disease, and there are but few essential characters (*i.e.*, modifications of its own features), by which one may be diagnosticated from the other. The central (or intrinsic) origin is inferred from the complication of pain with other nervous phenomena, or modications of nervous function; such as changes in the mental, sensorial, or motor properties: whereas the eccentric (or extrinsic) origin is recognised by the signs of disease or disturbance in other organs, or in the general system, over and above those for which the nervous conditions will account.

A. *Cephalalgia of extrinsic origin.*

1. In the acute specific diseases, it is rare for the patient to be able to describe the character of the pain; it is general in extent, and though often very severe and oppressive, is rarely intense and agonising, as in organic centric disease; and there are the proper extrinsic symptoms. (See Chapter VI. § IV.)

2. Rheumatic cephalalgia, accompanies other signs of the rheumatic diathesis; the suffering is augmented by pressure, and by movement of the muscles of the scalp, or eyes. (See Chapter VI. p. 80.)

3. Sympathetic headache, connected with disorders of the stomach, liver, or intestines, occurs in the morning; is often relieved by food; is variable in locality, but commonly diffused over the whole head, or most marked in the temporal regions;

at by finding, that the patient had been exposed to lead-poisoning, and that the cerebral symptoms were preceded by those of saturnine colic, &c.; the ordinary signs of lead-poisoning being at the same time present in the system. Convulsions occur frequently in an acute form, and prove fatal as the termination of chronic diseases. To these attention will be directed hereafter, and the reader is referred to Chap. XIV. for the diagnosis of hydrocephalus (chronic), from hypertrophy.

§ X. ACUTE CHOREA.

Using the term convulsion in the sense defined at p. 67, chorea does not properly fall into the same category, nor does it resemble those diseases, the differential diagnosis of which has been the object of this chapter. It is extremely rare for chorea to assume an acute, or rather hyper-acute form, and prove fatal in a short period of time. This does occur, however; but the diagnosis is not difficult, nor does it differ essentially from that of the disease in its more ordinary course; and, accordingly, the remarks to be made upon that subject will be postponed until chorea, in its common form, is the topic for consideration. (See Chap. XII., § VIII., Chorea.)

CHAPTER X.

ACUTE HYPERÆSTHESIÆ. CEPHALALGIA.

It is desirable to introduce some special observations upon this subject: for although almost all the diseases which the term includes have been already mentioned, or will be described hereafter, the contrasts which exist between their relations to hyperæsthesiæ, and particularly to cephalalgia, may be more readily appreciated by their separate consideration.

Pain in the head is so common an attendant upon every one of its organic diseases, or sympathetic disturbances, that we

have encountered it in each of the four preceding chapters. As an acute affection, it does not exist alone, and as a chronic disease it will be found in Chap. XII., § III., Hemicrania.

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2. Rheumatic cephalalgia, accompanies other signs of the rheumatic diathesis; the suffering is augmented by pressure, and by movement of the muscles of the scalp, or eyes. (See Chapter VI. p. 80.)

3. Sympathetic headache, connected with disorders of the stomach, liver, or intestines, occurs in the morning; is often relieved by food; is variable in locality, but commonly diffused over the whole head, or most marked in the temporal regions;

CHAPTER XI.

CHRONIC DISEASES, GENERALLY.

It is more difficult to separate chronic and acute diseases of the nervous system than of any other group of organs. This arises from the frequency with which some chronic diseases assume a latent form in respect of symptoms until they have arrived at a certain point, when, by the apparently accidental direction of their development, they impinge upon some more important parts than those which they have hitherto involved, and a group of striking symptoms is suddenly developed, assuming often an acute course, and terminating fatally in a short period. So far as symptoms are concerned, the disease has been acute; but anatomically it is chronic; since structural changes have proceeded with equal rapidity (or rather slowness) throughout. This is observed with regard to various tumors, chronic inflammatory (or at all events, exudation) processes, and some extrinsic diseases.

Again, disordered nutrition of the cerebral organs may not be altogether latent; but as it has advanced chronically to a certain point, it has been accompanied by a particular group of symptoms, which have given it the name and place of a chronic disease. Suddenly, however, a new group of phenomena is induced, having a rapid progress, and speedy termination; and thus the patient may be said to have died of an acute (separate) intercurrent disease, while post mortem examination reveals, as in the former case, a morbid condition of essentially slow development; and there may be no means of relating the sudden change of symptoms (both in respect of special character, severity, and acuteness) to anything beyond the gradual progress of the disease. The course of urinæmia is thus marked occasionally, when, after long-continued drowsiness and sensorial deficiencies, sudden convulsions occur, and terminate the case fatally in a few hours.

since tubercle is much more common than hæmorrhage, and the latter occurs most frequently in debilitated or unhealthy subjects.

B. *In the adult, and in old age*, there is less commonly variation from the ordinary course of hæmorrhagic symptoms. Convulsive movements have a similar value to rigidity—(see Chap. VII., § II., Hæmorrhage, p. 100)—*i.e.*, they indicate the bursting of hæmorrhage into the arachnoid cavity, or into the general ventricular space.* It is very rare for convulsions to occur until some hours after the apoplectic seizure; but they may be present at the moment of attack. When hæmorrhage supervenes in an epileptic or urinæmic subject, convulsions commonly attend its commencement. It is, however, by the hemiplegia, which has usually preceded, but which sometimes follows the attack, and by the general proportion between the symptoms, that a diagnosis may be established. (See Chap. VII., p. 97.)

When pain and mental obscuration have preceded the apoplectic seizure, and when the latter presents convulsive movements without limited paralysis, there would be found, in all probability, arachnoid hæmorrhage. (See p. 101.)

§ IX. HYPERTROPHY OF THE BRAIN.

It is not possible, in the present state of medical science, to arrive at the diagnosis of this condition until considerable enlargement of the head has taken place, and this is not the case except in chronic disease. However, there are cases, of which convulsion forms a prominent symptom during life, the course of which resembles rather closely that of meningitis; but which post mortem examination proves to be connected with hypertrophous induration of the brain. From a consideration of their intrinsic symptoms only, a diagnosis is impossible; but the probability of such a condition might be arrived at by finding, that the patient had been exposed to lead-poisoning, and that the cerebral symptoms were preceded by those of saturnine colic, &c.; the ordinary signs of lead-poisoning being at the same time present in the system. Convulsions occur frequently in an acute form, and prove fatal as the termination of chronic diseases. To these attention will be directed hereafter, and the reader is referred to Chap. XIV. for the diagnosis of hydrocephalus (chronic), from hypertrophy.

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* Durand Fardel quotes a case recorded by M. Beauvais, in which convulsions occurred during the course of hæmorrhagic apoplexy, but in which, post mortem, no blood could be discovered "dans les ventricules, ou en dehors du cerveau." Maladies des Vieillards, p. 258.

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3. Sympathetic headache, connected with disorders of the stomach, liver, or intestines, occurs in the morning; is often relieved by food; is variable in locality, but commonly diffused over the whole head, or most marked in the temporal regions;

is changeable in character; is relieved by vomiting, or purgation; and is accompanied by distinct signs of derangement in the gastro-intestinal system. When cephalalgia is sympathetic of uterine disorder, it is commonly stated that the occipital region is affected: but this local distinction is of little value, the vertex is often the seat of pain, and occipital headache occurs also from biliary derangement.

B. *Cephalalgia of intrinsic origin.*

1. Congestive. The pain is dull, heavy, oppressive; not commonly intense; generally diffused; of short duration; increased by stooping, or lying down; is accompanied by vertigo, or some temporary mental and sensorial obscurations. The colour of the face, heat of head, fulness of vessels, throbbing of carotids, prominent eyeballs, &c. &c., indicate its origin. (See Chapter VII. § I., Congestion.)

2. Inflammatory. The suffering is intense, and undergoes paroxysmal exacerbations; the pain is of darting, agonising character; is accompanied by various dysæsthesiæ, and the general signs of inflammatory disturbance. (See Chapter VI. § I., Meningitis.)

3. Organic diseases (such as tubercle, tumor, ramollissement, &c.) are attended by persistent pain; more or less confined to one spot; although radiating from this spot in various directions. The pain often undergoes paroxysmal exacerbations of great intensity; during the occurrence, or in the intervals of which, various other phenomena indicating disturbance of the nervous functions may be presented; such as loss of sight or hearing, confused talking, or some clonic convulsive movements of the limbs. (See Chapter VII. § II. and IV., Chapters IX. and XIV.)

4. Neuralgic headache is chronic in duration; intense in degree; and of lancinating, darting character, but limited extent. There are no additional signs of intrinsic, or of extrinsic disease. (See Chapter XII. § III., Hemicrania.)

It is sufficient to have pointed out these generic distinctions; the reader is referred to the several chapters mentioned above for the differentiation of specific diseases.

CHAPTER XI.

CHRONIC DISEASES, GENERALLY.

It is more difficult to separate chronic and acute diseases of the nervous system than of any other group of organs. This arises from the frequency with which some chronic diseases assume a latent form in respect of symptoms until they have arrived at a certain point, when, by the apparently accidental direction of their development, they impinge upon some more important parts than those which they have hitherto involved, and a group of striking symptoms is suddenly developed, assuming often an acute course, and terminating fatally in a short period. So far as symptoms are concerned, the disease has been acute; but anatomically it is chronic; since structural changes have proceeded with equal rapidity (or rather slowness) throughout. This is observed with regard to various tumors, chronic inflammatory (or at all events, exudation) processes, and some extrinsic diseases.

Again, disordered nutrition of the cerebral organs may not be altogether latent; but as it has advanced chronically to a certain point, it has been accompanied by a particular group of symptoms, which have given it the name and place of a chronic disease. Suddenly, however, a new group of phenomena is induced, having a rapid progress, and speedy termination; and thus the patient may be said to have died of an acute (separate) intercurrent disease, while post mortem examination reveals, as in the former case, a morbid condition of essentially slow development; and there may be no means of relating the sudden change of symptoms (both in respect of special character, severity, and acuteness) to anything beyond the gradual progress of the disease. The course of urinæmia is thus marked occasionally, when, after long-continued drowsiness and sensorial deficiencies, sudden convulsions occur, and terminate the case fatally in a few hours.

There is another difficulty with regard to the (paroxysmally) convulsive diseases. The idiopathic eclampsy of children and the epilepsy of adults present no definable pathological difference, except that the former is an acute, and the latter a chronic disease. If so, these difficulties occur,—a child, seven or eight years of age, is seized with idiopathic convulsions, and we have to determine whether the fits are those of an acute affection (eclampsy), or whether they constitute the first attacks of the chronic disease (epilepsy). Time will solve the problem, which sometimes cannot be solved by other means; but the question occurs, whether chronicity or acuteness may be made more than a secondary or tertiary basis of division, and consequently whether these commonly separated diseases should not be placed into the same list, and denominated by the same word. Sometimes in the adult, two or three fits take place, having all the features of developed epilepsy, but its chronic recurrence. Are we in such cases to say that the attacks were not epileptic, or are we to give up epilepsy from the category of chronic diseases?

The division of acute from chronic is apparently one of degree, and not of kind; although its clinical value is, in the present state of medical science, very great, as it enables us to form two large groups of diseases, the general characters of which are sufficiently distinct.

With regard to the classification of chronic diseases, there are many difficulties, and these are of the same character as those occurring in respect of the acute. The groups which may be separated clinically are found to have similar anatomical conditions; and, conversely, those which are separable anatomically present often the closest clinical resemblance. But this is not the only difficulty; another arises from the great frequency with which we find as phenomena of one disease, and in the same individual, exaltation of some functions and diminution of others. There is not often (in chronic disease) the simultaneous loss of perception, volition, sensation, and motility, as in apoplexy; or the coetaneous increase of ideation, sensibility, and motility as seen in meningitis; but there is disordered ideation, with increased motility (spasm) and loss of some particular sense; or any and almost every conceivable combination of derangements.

This being the case, we have to form groups according to the predominance of particular pathologic states; separating those in which the signs of exalted activity, or morbid "irritation" are the principal features, from those in which decrease of functional activity, or depressed action occupy the same relation; and forming a third group of those cases which present, as their habitual characteristics, the combination of both classes of derangement. (See p. 68.)

It remains for me to add some few remarks upon the reasons which have led me to place epilepsy, catalepsy, hysteria, chorea, and paralysis agitans among the chronic diseases of the brain. We cannot but admit that the precise locality of their cause is uncertain; although it appears probable that epilepsy and catalepsy are closely related to functional derangement of the spinal cord, and that hysteria and chorea have their starting place in some morbid condition of the emotional and sensori-motor centres. But, how far diseases of the blood are connected with any or all of these we cannot at present say; the symptoms of epilepsy, catalepsy, hysteria &c., are, many of them, essentially modifications of the cerebral functions; and the lesions which are discovered, post mortem in the former, are most commonly present in the encephalon. Deficiency, or a perverted condition of the will in many of its relationships, are as constant phenomena of these diseases as are the signs of spinal activity: the mind, in its relations to motility, and sensation, is often more deeply affected than any other separable vital element; and, until it can be shown that all the symptoms of these various and ever-varying maladies are clearly referrible to particular derangements of definite nervous centres, it appears to me most judicious to leave the question so far open as it is left by the present chapter, and the subsequent position of those diseases—*i. e.*, to group them with clinically-allied affections, involving (as they most certainly do to a notable extent) the proper functions of the brain. It has been necessary to do this with regard to acute convulsive affections (see p. 121): and the reasons for adopting this mode of classification are the same in each instance.

CHAPTER XII.

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DISEASES CHARACTERISED BY EXALTED ACTIVITY.

As it has been already stated, these characteristics rarely exist in an uncomplicated form; but there are some morbid conditions (which may be termed separable "diseases,") in which there is such marked predominance of one particular derangement, or class of derangements, that it gives the essential features of the cases in question; and although various epiphenomena occur, they are of subordinate importance only, and produce little modification in the general character or progress of the disease.

Many of the affections which form the subject-matter of this chapter, are, so far as we can ascertain, dynamic only; but it is probable that future researches will reclaim several from that list; by showing that some are dependent upon definite physical lesions, and others upon morbid conditions of the blood. We have to differentiate the following:—

A. Excessive ideation.
    I. Hypochondriasis.
    II. Tarantism.
B. Excessive sensation.
    III. Hemicrania, or hyperalgesia cerebri.
    IV. Hallucinations.
    V. Illusions (vertigo of sensation, &c.)
C. Excessive motility.
    VI. Vertigo of motion (rotatory movements).
    VII. Co-ordinated spasm (muscular tic).
    VIII. Chorea.
    IX. Tremor (paralysis agitans).

A. DISEASES MARKED BY EXCESSIVE IDEATION.

§ I. HYPOCHONDRIASIS.

The diagnosis of hypochondriasis from diseases of the nervous system is more easy than from organic diseases in other regions of the body. But although sensation, motility, and the nutritive processes are more or less disturbed in many cases, the predominant character is derangement or exaggeration of ideas in reference to self. It is because the primary element of disease in hypochondriasis appears to consist of this change in the feelings and ideas, the affection comes under notice in this treatise. When, at a subsequent period, the nutritive processes become deranged in various organs, their morbid condition is secondary; and inasmuch as they then add intensity to the erroneous action of the mind, they afford an interesting illustration of the reciprocal influence which the material substrata and immaterial properties of our complex organism exert upon each other.

From eccentric diseases hypochondriasis is diagnosticated by the absence (at all events) at its commencement of any physical or objective signs of disease at all commensurate with the patient's account of his subjective symptoms, and also by the variable character of the latter. They are upon one day referred to a particular group of organs, and upon the next day to another; and they often present combinations utterly incongruous with the interpretation of them given by the unhappy patient, and also with any relation to definite organic derangement. Further, these variations may be traced to, and found correspondent with, certain mental states, which are more or less accidental in their occurrence, and dependent upon external suggestion. Hypochondriasis is the exaggeration, or increase to a morbid degree of intensity, of that property which every one possesses, more or less, by virtue of his physiological and psychological endowments, viz., of creating around him, or within himself, sensations, which (are not the result of external impressions or corporeal conditions, but which) having their origin in the mind, are, as it were, projected outwards, and represented objectively in the material organs. It is not the translation of an objective, physical condition into a subjective phenomenon of consciousness (the ordinary process of sensation and perception); but the transference of the latter, subjective in its origin and essence, into an apparently, and sometimes a real, objective or external change.

From melancholia, the diagnosis is based upon the hypochondriac's constant self-regard, and the habitual reference of his delusions to the corporeal sphere. Mental and moral dispositions are unchanged in their social relationships; but the individual is constantly (*i. e.*, when undiverted) dwelling with misery and apprehension upon his own miserable state. Every external or internal change is watched with fear; and the patient is an habitual valetudinarian—carefully selecting his diet, and examining his evacuations with a scrutiny that would do credit to the most earnest pathologist. The most prominent subjective effects of ideation thus morbidly exaggerated and misdirected are painful and very anomalous sensations. In protracted and severe cases physical derangements occur in the organs thus carefully tended; and such changes only add intensity to the previous morbid propensity of mind. Sometimes motor phenomena, such as spasm and palpitation, are induced; but more commonly there is prostration of strength, incapacity for exertion, and general lassitude.

From hysteria, one important distinction is sex; the male being much more subject to hypochondriasis, and the female to hysteria. But exceptions occur in each direction: and there may be—as I have seen not unfrequently—a combination of the two groups of symptoms. Romberg says that he "should feel inclined to designate it (hysteria) the only contrast of hypochondriasis;"* but this appears to be without due reason. Each has its base and starting-place subjectively, and is reproduced or represented objectively: sensations are commonly the result of hypochondriasis, and motor phenomena of hysteria ; but neither is confined exclusively to one or the other ; and one prominent feature of each is perverted ideation with regard to self. The hysteric patient, however, exhibits morbid (objective) phenomena ; while the hypochondriac does not (until an advanced period) ; and the predominance of motor disturbance will generally serve to distinguish the former. (See Chap. XIV., Hysteria.)

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* The Nervous Diseases of Man. Syd. Soc. Trans., vol ii., p. 185.

To resume. The male sex: the predominance of sensorial disturbance, the special direction of mental activity upon self, with dread of impending danger and present disease, without other changes in the mental and moral faculties, and without any discoverable organic basis for the symptoms, constitute the features by which hypochondriasis may be diagnosticated.

§ II. TARANTISM, DANCING MANIA, ETC.

Very few words are necessary with regard to these diseases. In their exaggerated form—sometimes occurring endemically—no difficulty can be felt as to the diagnosis. In less marked intensity they present some resemblance to co-ordinated spasm. (See § VII. of this chapter). There is, however, this difference between co-ordinated spasm and certain varieties of the dancing mania, that in the former there is no discoverable relation to sensation and ideation, whereas in the latter there is. Sonorous impressions, or the sight of particular objects, appear to be the occasioning causes of its extravagant phenomena; an excess of sensorial, emotional, and ideo-motility, constituting the essence of the disease. The prevailing idea of the time may mould to its imperious mandates the whole being of many individuals ; and thus certain classes of ideas take possession, not only of the mind, but also of the life ; the mental state passing out of the sphere of consciousness into that of action.

The essential features of tarantism, dancing mania, &c., are the grotesque spasms of co-ordinated character, occurring in connexion with perverted ideation and emotion, and in immediate dependence upon sensation.

B. Diseases marked by Excessive Sensation.

The term excess of sensation has been used instead of hyperæsthesia, as the latter expresses simply an exaltation or increased acuteness of the particular faculty by which we become acquainted with the properties of the external world, and consequently does not apply to the class of morbid phenomena now under consideration. The first of these is characterised by pain, the second by false sensations, the third by modifications of real (objective) sensory impressions. Each is an example of increased sensation; but neither is an example of true hyperæsthesia.*

§ III. HEMICRANIA.

This disease, known also by the names neuralgia cerebralis and la migraine, may be confounded with meningitis, but more probably with sympathetic cephalalgia, or with neuralgia of the frontal branch of the fifth pair of nerves (see Chap. X. for Cephalalgia, and Chap. XX. for Neuralgia); but its diagnosis may be established by a consideration of the following points:—

1. Relation to age. Hemicrania occurs at any period of life; but it most commonly commences at puberty (although it may appear earlier); rarely, if ever, makes its first attack after completion of the twenty-fifth year, and generally disappears before the fiftieth year.

2. Relation to sex. The female sex is more subject to its occurrence than the male; and in the former it is apt to recur at the menstrual periods. It may, however, exhibit no periodic tendency.

3. Precursory symptoms may be wholly wanting; or they may consist of various extrinsic phenomena, such as gastric and hepatic disturbance, with pain in the epigastric region, anorexia, nausea, &c. More commonly they are intrinsic, such as irritability of temper, chilliness, &c., of no very definite character. The prodromata which are of some importance in the diagnosis are the following:—Imperfection of vision in one

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* See Chap. II., p. 28, for Modifications of Sensibility.

eye; and the presence of variously coloured spots, exhibiting ciliary motion, also confined to one eye. Less commonly, the ear is affected in a similar manner, the symptoms being dulness of hearing, with tinnitus on one side only.

4. The attack consists essentially of pain; limited to one side of the head; most intense in the supra-orbital and temporal regions of that side; but not following closely the course, or distribution, of particular nerves. Sometimes the pain is not clearly defined at the median line, and it may become general: it commences with trifling severity, but soon reaches a very high point; is accompanied by throbbing sensations; and is much increased by strong sensorial impressions, or by movements. Slight contractions, or temporary paralyses of the facial muscles, sometimes occur; and the patient is always deeply affected in temper and spirits, becoming irritable and desponding.

The duration of an attack is seldom less than six hours; it rarely lasts longer than two days; and most commonly is between twelve and twenty-four hours. At its decline, nausea and vomiting sometimes occur, followed by refreshing sleep; or, in some cases, by rather profound stupor.

The period of return is variable, and may be regular, or irregular; the latter is the more common. In respect of frequency there is great variation: the attacks may occur every week, or only two or three times in the year; and they are less frequent at the commencement and decline of the disease. They commonly run the same course, and affect the same side of the head (usually the left) in the same individual. There are, however, exceptions to this rule.*

5. The intervals of attack are commonly marked by no symptoms; the patient may be in perfect health. If cut off by intercurrent disease, there are no anatomical conditions discoverable to account for the symptoms; so that, in the present state of our knowledge, it must be considered as a dynamic (or functional) affection.

6. Differentiation from other diseases. Meningitis is excluded by the absence of delirium, febrile excitement, and the

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* Sandras. Traité des Maladies Nerveuses, tome i., p. 340.

subsequent stages of an inflammatory process. Sympathetic headache is also excluded by the non-appearance (except subsequently) of distinct eccentric disturbance. The idea of neuralgia of the fifth pair is precluded by the absence of limitation to particular branches of nerves, and by the peculiar character and duration of the pain; while its own special (positive) features are sufficiently distinctive to render the diagnosis comparatively easy in the majority of cases.

§ IV. HALLUCINATIONS.

Under this head "mental delusions" are not included, nor are "sensorial illusions;" they are the phenomena from which hallucinations require to be diagnosticated. By the former are intended those fictitious products of a diseased mind which constitute the pathognomonic features of insanity: by the latter, the simple distortion of an actually existing sensorial impression.

The individual experiencing delusions believes fully in their existence as realities; to him the false creations of the world within supply the place of that which is true without; there is a want of correspondence between what objectively exists as fact, and that which is subjectively received as truth; and from the condition of such a person, that of the subject of hallucination differs.

From the delusion of insanity, hallucinations are separable by their relation to intellectual belief. Delusions take possession of the entire consciousness; and are frequently of such sort that they do not come in contact with objective impressions; as, for example, when referring to the individual's own motives or past conduct, the intentions and feelings of his friends, or his own relation to the Supreme Being, and to time. In these cases, mental processes, in their innermost and most distinctly subjective spheres, are disturbed; and such delusions are in no danger of being confounded with hallucinations. Sometimes, however, the individual projects his creations out of himself, and out of the range of metaphysical conditions, into the external world, which he fills with the images of material objects, in correspondence with his own disordered mind. When this is the case in dependence upon mental derangement, the (subjective) images are presented to each sense; occupying, more or less correctly, the relation to each which they would occupy if possessed of real existence. Either no attempt is made to correct the appearance to one sense, by the application of another, or, if the attempt is made, it fails; the mental disturbance which produced the one being equally capable to effect the other: the man thus sees no reason for doubting the (objective) reality of his perceptions; since the phantasm which fills his field of vision is not only seen, but heard and felt.

Unless a man believes that his delusion is not a delusion but a reality, it cannot be said that he is of unsound mind. But he who cannot convince himself of the unreality (or fictitious character) of these phantasms, is in effect, *pro tanto*, mentally insane. The milder term, hallucination, has been employed sometimes to designate this condition, because the individual presenting it has been, upon every other point, in mental health; but the difference is merely one of degree, and the case cannot be separated from monomania.

Hallucinations differ, then, in this most important character from mental delusions, that the subject of the former, although his phantasms may have the appearance of reality, does not believe in their objective existence; whereas, the subject of the latter does.

The distinction from sensorial illusions is one simply of observation; the latter being of two classes (see § V.) one referred directly to the organ affected, such as tinnitus aurium, &c.; and the other to external objects, such as objective vertigo, &c. Sensorial illusions consist essentially in the distorted perception of a real external impression.

§ V. ILLUSIONS.

There are many phenomena which must be considered as sensorial illusions, and their study is one of great interest in relation both to physiology and psychology. In a treatise upon diagnosis, however, they require but a brief notice, and will be divided into two groups:—

1. Those which are immediately referred to the organ affected, from their presenting no appreciable resemblance or connexion with surrounding objects; such as muscæ, tinnitus aurium, &c.

2. Those which are referred externally; but which follow and depend upon recent or present impressions, and consist essentially in a modification of the latter, or of their resulting perception; for example, sensory vertigo of objective character, spectra, &c.

I. Illusions of the former class are occasioned most commonly by morbid systemic conditions, and these may be of very different character. It is probable that any state which differs from that which is habitual may be the cause of somewhat similar phenomena, from the simple fact of change acting as a stimulus (or occasional cause) of nervous action. Thus anæmia, hyperæmia, and toxæmia are alike attended by tinnitus aurium, &c.

The distinction of illusions from hallucinations has been proposed and urged on the one hand; criticised and discarded on the other. To my own mind, it appears that it is one of real existence, and of no less real importance; as there are reasons for thinking that the former depend upon some abnormal condition of the peripheral extremity of the sensory nerves, and the latter upon some change in the sensorial centres. Practically the two may be separated, by hallucinations assuming a definite and meaning form; corresponding to and occasioning a distinct mental picture, but independent of any present objective impression: while, on the other hand, illusions have no defined or intelligible form; induce no intellectual change (except that of annoyance, from their disagreeable nature); and very frequently depend upon external causes, or are distinctly referrible to the organ affected. Thus, hallucinations of hearing resemble voices in conversation, and distinct sentences may be heard; whereas, illusions consist of humming and droning noises (which convey no appreciable idea). Hallucinations of sight are distinct phantasmata, human or other forms, landscapes, &c.; but illusions consist of sparks of light, black spots upon objects looked at, the easily referred (peripheral) spectra of external objects, or the apparent motion of the latter.

The distinction of illusions dependent upon centric from those referrible to eccentric causes (and among the latter must be included physical defects in the organs of sense), is to be arrived at by the general differences already described as the means of diagnosticating extrinsic from intrinsic diseases. (See Chap. IV., p. 52.)

II. The most important illusion belonging to the second category, is,—*vertigo of sensation.* Its diagnostic value is not great, as it is very readily induced by trifling changes in the encephalic circulation, by sympathetic disturbance, and by almost every organic disease of the brain. However, it is sometimes almost the only intrinsic symptom of which a patient may complain, and then it becomes very important to know whether it depends upon eccentric or centric disease.

There are two varieties of sensory vertigo, which appear to be perfectly separated by different cases, and which are influenced differently by sensorial impressions; one is objective, the other subjective: in the former, external objects appear to move; in the latter, the patient feels as if he were himself moving. It is important to distinguish,—

a. Vertigo of eccentric origin—*i. e.*, dependent upon sympathetic disturbance. This may be known by the following characters:—

i. It is induced without objective causes, such as the motion of surrounding objects, or of the patient's own body.

ii. It is commonly subjective in character. This is not invariably the case, but in vertigo of eccentric, especially when of toxæmic origin (such as that resulting from alcoholic and urinæmic intoxication), it is extremely common.

iii. It is relieved by the impression of some fixed object, such as a steady gaze, lying down at full length, grasping some body with the hands, &c.

iv. It is increased by closing the eyes, thus shutting out iii.

v. It is accompanied by the signs of extrinsic disturbance in the gastric, hepatic, or other organs; some of these are peculiarly prone to induce vertigo—*e.g.*, hepatic disturbance, with the suppression of secretion, or the excess of bile in the intestines, and its regurgitation to the stomach.

vi. There are no other (intrinsic) symptoms of centric disease.

b. Vertigo, of centric origin, has generally some of the following characters:—

i. It is commonly induced immediately (*i.e.*, in respect of time) by some sensorial impressions; such as movement of the body, or of surrounding objects.

ii. It is most frequently objective in character.

iii. It is relieved by shutting out external objects (closing the eyes, observing perfect quiescence, &c.).

iv. There are no eccentric phenomena of note.

v. There are certain intrinsic symptoms of nervous derangement, such as cephalalgia, other illusions of sensation, a tendency to vertigo of motion (see § VI.), delirium, &c. &c.

There is a form of vertigo which has appeared to me not at all uncommon, and to which Dr. Marshall Hall was the first to direct attention. It occurs from derangement of the cerebral circulation by impeded return of blood, owing to contraction of muscles situated in the neck. From experimental and clinical observation, I feel confident of the reality of this occurrence; but its frequency and importance have yet to be discovered. The diagnosis of such vertigo can only be ascertained by observation of a spasmodic contraction in the muscles; it may be suspected from the existence of a feeling of constriction in the neck, or from the fixation of muscles; with flush, or darkened tint of face. Pathologically, this form of vertigo is one of the phenomena of increased reflective (spinal) activity. (See Chap. II., p. 37.) Its special features are not accurately known; but in those cases which have appeared to me the most distinctly trachelismal, the vertigo has been of subjective character.

Spectra belong to the second category, and it is important to distinguish them from hallucinations. They commonly present close resemblance to objects which have recently made impressions upon the organs of sense; and there is this difference between these spectra, which result from conditions of the peripheral extremity of the nerve, and the phantasms which are due to central changes, that they occupy different relations to the organs as physical instruments. Illusions of sight exhibit a peculiar, oscillating, vibratory, or ciliary motion; and the spectra, which may be formed by gazing upon certain objects, increase in apparent size if the eyes are removed to a more distant object, and diminish if they are fixed upon something nearer to the individual. Thus the greater the apparent distance to which the spectrum is thrown, the larger it appears, and *vice versâ;* whilst, in true hallucination, the image, if it moves, obeys the ordinary laws of objective vision with regard to apparent distance, viz., that of diminution with removal from the individual, and apparent increase upon approximation. It is very easy to confirm this observation with regard to ocular spectra, and its rationale is sufficiently obvious to require no farther comment.

There is but one further remark necessary with regard to the distinction of sensorial illusions when of centric from those of eccentric origin; and it is, that, while the latter are commonly general in their distribution, affecting not only different organs of sense, but those of opposite sides, the former are very frequently limited to one side, or even to one special sense. In the discrimination of sensorial illusions dependent upon the external organs from those induced by central disturbance, the organs must be examined carefully for any signs of disease in them; and, in the event of its absence, we may infer that the cause is cerebral (or sensori-gangliar) if more than one sense is affected, and if there are other phenomena of cerebral affection; whereas there would be strong suspicion of their dependence upon the external organ of sense, if the symptoms were referrible to that one organ only, and were developed apart from any other signs of intrinsic disease.

C. Diseases marked by Excessive Motility.

The form of motility which is in excess is essentially avolitional; and the true pathology of the conditions included in this sub-division is very doubtful, but the diagnosis of four separable diseases is comparatively easy.

§. VI. MOTOR VERTIGO.

This variety of disordered motility is extremely uncommon, as a well-developed phenomenon; and, when present to any marked degree, it indicates serious disturbance, generally organic lesion of some part of the sensori-motor apparatus—*i. e.*, of the cerebellum, or the sensory ganglia, or of some of the fibres placing the two former in functional relationship. Falling forwards has been observed in connexion with disease of the corpus striatum,* or of the pons Varolii,† or of the crura cerebri.‡ Rotatory movements have been witnessed when the cerebellar peduncles are diseased,§ &c. &c.; but it is impossible, in the present state of medical science, to arrive at any positive diagnosis of locality from the special character or direction of the symptoms. Some of the many facts connected with this obscure branch of pathology I have already endeavoured to group together and interpret in a pamphlet on Vertigo,‖ to which the reader is referred for a sketch of our knowledge upon the subject, and the means by which it has been obtained.

Though rare as a well-developed vertiginous movement, some of the slighter degrees of motor vertigo are by no means uncommon. For example, the staggering movements of quasi-rotatory character which very frequently attend the sensation of giddiness may be considered of this character. The man who has taken more alcoholic stimulus than he can bear, has slight subjective vertigo (sensorial). The increase of stimulus induces objective vertigo, but consciousness may be unimpaired; still further stimulation produces vertigo of motion, and the man staggers in his attempt to walk; excessive quantities of the poison produce complete absence of perception and effective will. These relations to volition are interesting and important: the involuntary movement does not occur unless there is some separation of the will from muscular contraction.

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* Manual of the Nervous Diseases of Man. Romberg. Syd. Soc. trans., vol. ii., p. 158.

† Romberg, loc. cit., p. 159.

‡ Case by Dr. Paget. Medical Times and Gazette, Feb. 24, 1855.

§ Anatomie Comparée du Cerveau. Serres. Tome ii., p. 623.

‖ Vertigo (a paper read to the North London Med. Soc. by) J. Russell Reynolds.

Motor vertigo, as a sympathetic phenomenon, is by no means uncommon in connexion with functional derangement of the heart. It is carried only to the extent of staggering movements, with a somewhat rotatory tendency; and it has appeared to me more common than sensory vertigo (from heart affections), or than motor vertigo, from gastric and hepatic disturbance. It by no means indicates morbus cordis of organic character, though common as a phenomenon of left hypertrophy: generally it arises from a nervous temperament, and easily disturbed heart; and has, for its occasional causes, gastric and emotional changes, the former commonly depending upon flatulent accumulation.

§ VII. CO-ORDINATED SPASM.

This term is employed by Romberg* to denote those general disturbances of motility which result in the definite movement of the whole body into some peculiar attitude, resembling that which might be produced by the will, but which occurs independently of volition or idea, and often in direct opposition to the former.

Dr. Marshall Hall† has used the expression "*muscular tic*," to denote a less general disturbance of the same character. The former term simply expresses the fact; but the latter, perhaps unintentionally, conveys a theoretical explanation (viz., that the spasm is muscular in its origin), which may be correct, but which is open to some question. It is therefore preferred to group these phenomena, which differ in degree rather than in kind, under one name, and the former is preferred.

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* Romberg's Manual, vol. ii., p. 167.

† Clinical Observations, &c. Lancet, 1852.

1. Co-ordinated spasm may be distinguished from tarantism by the peculiar features of the latter, and their dependence upon sensational and ideational changes. (See § II. of this chapter.)

2. The distinction from chorea is based upon the localisation of co-ordinate spasm and its duration. The former is more limited: special groups of muscles are affected, such as those of expression; those of the hand, employed in painting or writing (the "writer's cramp"); or those of expiration and inspiration, inducing peculiar and often very disagreeable noises. The duration of co-ordinated spasm is much greater than that of chorea: it is an essentially and obstinately chronic affection in the majority of instances. There are no other derangements of the nervous system, or the general health.

§ VIII. CHOREA.

Two important questions occur as to the position of this disease in any system of classification: the first is, with regard to locality; the second is, in reference to its nature. They may be stated thus,—

1. Is chorea an intrinsic or extrinsic disease; and, if the former, to what portion of the nervous system are the symptoms due?

2. Is it, strictly speaking, a chronic affection?

1. With regard to the first question, it must be allowed that there are many reasons for thinking that the blood is (at all events in some cases) primarily diseased. The precise nature of blood-change is, however, not only unknown, but we cannot say with any positiveness, whether such changes, as may be inferred to exist, are to be sought for in its physical, vital, or chemical properties: and, further, there are many cases of chorea, which, if not demonstrably nervous in their origin, are almost exclusively intrinsic in their phenomena. Although rheumatism, or other cachæmiæ, may appear to be the cause of chorea in some instances, there is an equally large number in which the symptoms are clearly traceable to emotion; and, until it can be shown with more certainty that the disease

is extrinsic in its origin, and in the modus operandi of its materies morbi, we are compelled to retain it among the intrinsic diseases. The frequent existence of rheumatism, &c., without chorea, and *vice versâ*, indicates that something more than the simple presence of the former is necessary to induce the latter; and leads to the conclusion, that when the two co-exist there is not any necessary or direct relationship (of cause and effect) between them, but that the blood condition is only one of many occasional causes, the real essence of the disease being a perverted nervous function.

Considering chorea from this point of view, we have next to inquire what portion of the nervous centres is specially involved: and the following facts appear to indicate that it is not the spinal cord; or, in other words, that the spasmodic phenomena are not those of simple reflection.

a. Clonic spasm of this incessantly repeated character is not a phenomenon of persistent spinal irritation. (Tonic spasm is the mark of such a condition.)

b. The movements (unless very severe, and even then to some extent) can generally be somewhat controlled by the will; and it is certain that the purely (asensuous) reflections are not amenable to volition, at all events to the same extent.

c. The spasmodic contractions cease during sleep; whereas the phenomena of excito-motor character are increased by this removal of volition. The direction of attention to some other object likewise diminishes the intensity of choreic movement.

d. The special occasions of increase, or of induction of choreic movements, are the attempts at volitional action, and emotional changes.

The essential phenomena may be resolved into more or less active disturbance of the co-ordinating function; but whether this is dependent upon the sensational, or the motorial elements of that twofold property, cannot be positively asserted. There is no reason for suspecting derangement of the former, as there are no evidences of sensorial change; and, farther than this, the movements are of a violent, and independent character, by no means referrible to simple interference with—*i. e.*, absence of co-ordination.

2. Ought chorea to be placed among chronic diseases? Its ordinary duration is about eight weeks (from six weeks to two months and a-half—Barthez and Rilliet); but in slight cases it is much less; and in more severe, it is often prolonged for many months—*i. e.*, the patient continues to exhibit choreiform movements of moderate or feeble intensity, especially when under the influence of emotion. I have seen several cases of persistent choreiform movements in girls who have had occasional epileptic attacks. Four or five such cases have been under my notice for more than two years, and the movements remain, although the epileptic attacks have diminished both in frequency and severity.

Choreiform spasms are, then, in many cases, of very great persistence; but there are two further reasons for including this disease in the category of chronic affections. The symptoms are developed gradually, reach a certain point of intensity, remain at such a point for a very variable period, and it is often a long time before all traces disappear. The progress of development is slow in the majority of cases; and, again, it is common for the disease to recur in the same individual; and, taken in connexion with the frequent persistence of some choreic movements in the intervals of attack, this fact appears to indicate, that the motor symptoms are but the exacerbations, and external phenomena of a diseased condition; essentially chronic both in its duration and character. The occasional occurrence of chorea in an acute and fatal form, in which commonly there is more distinct general disturbance both of intrinsic and extrinsic character (although the essential choreic symptoms are the same), renders the position of chorea, assuming its ordinary course and duration, among the chronic diseases. (See Chap. IX., p. 138.)

The diagnosis of chorea is not often attended with much difficulty:—

1. Precursory conditions. The female sex, nervous temperament, and approximation towards the period of puberty, are

the most frequent general conditions associated with chorea. More rarely it occurs in the adult, and appears to bear some relation to the cessation of menstruation, or to pregnancy. It may happen at this period of life (and this is commonly the case) in those who have not suffered from previous attacks.

Distinctly morbid prodromata are neither frequent nor characteristic; a certain susceptibility of nervous disturbance and irascibility of temper are not uncommon, but they are not always present. The rheumatic diathesis is apparently a predisponent. It is not rare to find that the child has been out of health for some time; and this may arise from various causes, such as the delay of menstruation, general diseases, exanthemata, &c.

2. Developed symptoms. Their commencement, although occasionally sudden (following some emotional disturbance, such as "fright," &c.), is more commonly gradual, and at the first insidious; consisting simply of restlessness, or hurried, and somewhat clumsy movements. The left side and the upper limb are frequently affected first; subsequently the whole body is involved. The essential phenomena of chorea are motorial; spasmodic (involuntary) contraction of the muscles; and these contractions are of twofold character.

i. Clonic spasms; unattended by pain; of great frequency, but of not very marked intensity; passing through no definite series of groupings (as the epileptoid convulsion does); and resembling the restless movements of a child who has been irritated, or put out of temper. These spasms occur independently of any attempts at voluntary movement; are in slight cases almost unobserved; and when the eyes are closed, and attention is completely absorbed, may be absent altogether.

ii. Every kind of disordered movement in the muscles and limbs, when the patient makes any attempt to perform voluntary actions. The fingers, hands, arms, legs, trunk, and head are thrown into every possible contortion; and the expression of the face is nothing more than a series of grimaces. Speech is obstructed; and it becomes, in severe cases, utterly impossible for the patient to do anything which requires the co-ordination of movements.

The spasms are increased by emotion; persist through the day, but almost invariably disappear during sleep, unless the patient dreams, when they are said to recur. Sometimes there are periodic exacerbations. Muscular power is enfeebled, especially in persistence, but somewhat in force. The heart acts irregularly (both in force and rhythm); and murmur, probably of dynamic origin, may be often heard at the mitral (left) apex. The diaphragm exhibits spasmodic action; and the interference with deglutition, indicates that not only the external muscles (of the life of relation) are affected, but also those which are placed in more immediate connexion with the organic (individual) life.

b. Mental. Intelligence is not essentially changed, but there is, in many cases, apparent diminution of apprehension.

c. Sensibility is normal. Sometimes pain of aching character is found in the limbs; but this is not common.

d. The organic functions are generally performed as in health; but it is very common to find that chorea is associated with some amount of spanæmia and innutrition.

3. Course and termination. The most common course is that already described, gradual decline, and complete removal of the spasms. Sometimes, however, slight symptoms remain for a very lengthened period: sometimes the disease is fatal, and this is observed most commonly when the affection supervenes during pericarditis, and when it assumes an acute form. The prominent symptoms are the same; but the patient loses rest at night, and becomes exhausted: the spasms are exceedingly violent; involuntary micturition and defecation occur; the mind wanders; nourishment is not taken; emaciation progresses rapidly, and death occurs in a few days (nine to twenty).

It is a curious fact, that if one of the exanthemata is developed during the existence of chorea, the latter commonly diminishes, and may disappear altogether. This is denied by many authors; but there is sufficient evidence to prove the occasional relationship described.*

There is but little danger of confounding chorea with any other disease if its earlier symptoms, mode of development, and special characteristics are examined with ordinary care. Pathological anatomy reveals no constant lesion to which the phenomena may be referred; and those cases which depend upon, or at all events accompany, the progress of organic disease in the encephalon, spinal cord, or nerves, cannot be diagnosticated from the dynamic affection during life, except in rare instances; and it is then by the addition of symptoms over and above those which are proper to chorea itself.

§ IX. TREMORS. (PARALYSIS AGITANS.)

The term paralysis agitans is essentially bad, as paralysis does not necessarily exist in the condition referred to, and when present, as in some cases, is not primary; the relation of muscular power to volition and involuntary motility being somewhat analogous to that of chorea. The patient can do little with his affected limbs; but it is because of their constant agitation, not because of their paralysis.

Tremor of this character is very common in advanced age, and especially in debilitated subjects. Although variable in intensity, it rarely leaves the patient in whom it has been once fully developed. The movements are for the most part general in their distribution; consist of alternate flexion and extension; and are much increased by emotional disturbance: they interfere with the performance of voluntary efforts; but are present when no attempt at motion is being made: they commonly cease during sleep; but may be so violent as to prevent sleep altogether. Muscular power is generally deficient; the intelligence is enfeebled; emotional movements often become excessive, passing altogether the limits of volitional control; the head nods forward upon the sternum, and there is every sign of physical and mental decrepitude.

Tremor of this kind occurs sometimes with a partial distribution, and at an earlier age, the individual presenting, it may be, no other symptom of disease. The pathology of such conditions is quite undetermined. Dr. Paget has drawn attention to the fact of "the peculiar tendency to fall forwards," the patient, to save himself from falling, "being under the necessity of walking on his toes, with short, quick steps;"[*] and he has further suggested that the crura cerebri should be examined in such cases, and in those of which nodding movement of the head is a characteristic symptom. Dr. Paget's suggestion is well worthy of consideration (it is based upon the observation of a case of "falling forwards" in a man who died of disease in the crura cerebri; and also upon Flouren's experiments);[†] but there are not sufficient data (and there are some opposed in their character) to warrant the supposition of any necessary relation between either falling forwards, or paralysis agitans, and disease of the crura cerebri. (See § VI., Motor Vertigo.)

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* Barthez et Rilliet. Op. cit., tome ii, p. 304.

CHAPTER XIII.

DISEASES MARKED BY DIMINUTION OF FUNCTION.

The chronic diseases which are characterised by deficiency of functional activity, or loss of nervous vitality, are exceedingly numerous; but they rarely exist in an isolated form, or even so much separated from other nervous phenomena as do the opposite conditions of augmented activity. They may occur in distinct dependence upon local causes, such as disease or injury of the nervous trunks; which are considered in the fourth part of this treatise: and they may also persist as the chronic conditions of some primarily acute disease (such as, for *e.g.*, the paralysis remaining after cerebral hæmorrhage),

[*] Medical Times and Gazette, Feb. 24, 1855.

[†] Recherches Expérimentales, ed. ii., p. 489.

the diagnosis of their cause being then based upon a recognition of the earlier symptoms. It is not my intention to consider either of these groups in the present chapter; but to refer only to one easily separable disease, viz.:—

ANÆSTHESIA MUSCULARIS.

This is liable to be confounded with paralysis; but is most certainly a distinct morbid condition. In many cases of established paralysis, and especially in those which have assumed a bilateral (paraplegic) form, it is found that the earliest symptom, which attracted the attention of the patient, was, not absolute loss of power, but a diminution in the faculty of controlling movements. It has occurred to me in several instances to recognise this condition at an early period, marked as it is then by the following characteristics:—

1. Cutaneous sensibility is unimpaired—*i.e.*, as judged of by mechanical irritation, changes of temperature, and the special sense of tact.

2. The special senses (sight, hearing, &c.) are normal, with an occasional exception, to be pointed out.

3. The mental and emotional conditions are natural.

4. The reflective functions are not interfered with; deglutition and respiration are natural; there is no exaltation of susceptibility.

5. Motility is in a peculiar condition.

a. There is no absolute loss of power; the patient can grasp firmly and equally with either hand; he can strike out the legs with force, or even violence; he can perform any acts (*i.e.*, in slight, or commencing cases) to which attention is directed, and upon which sensational guidance can be brought to bear; but he performs them clumsily.

b. Without looking to see, however, he does not know the position of his limbs; nor can he execute instantaneously the movement he intended, but sometimes succeeds only after one or two unsuccessful attempts.

c. Movements or positions which were assumed voluntarily (as, for example, by the aid of sight) are not maintained, if the patient removes his attention to some other object. If the eyes are closed, objects fall out of the hand; and, upon any attempt to move, the patient reels like a drunken man, or may fall to the ground.

d. Finer movements, requiring delicate muscular adjustment, may be utterly impossible, or accomplished only by dint of great volitional effort and care.

e. Diplopia is not unfrequent: the patient sees well with either eye, tried separately, but when the two are used, their axes are not made to converge properly.

f. These changes are often limited locally to one or two limbs, and are most common in the lower extremities.

The condition is not one of simple want of the co-ordinating faculty, for the latter remains to a considerable, and sometimes perfect extent, when the eyes are employed (whereas, when the power of co-ordination is lost or diminished, no actions can be properly performed, even although sensational guidance is allowed). It appears to be due to diminution, or the absence of one most important sensory condition, and instruction (if the term may be used) of the co-ordinating function, viz., the muscular sense, or the intuitional perception of muscular states.

In the present state of science we are unable to refer anæsthesia muscularis to any particular organic change of a special organ. It may, in some instances, be dynamic only; and most probably is so in those cases of so-called paraplegia (of which it is, in reality, the only definite symptom) where there is exhaustion as the effect of previous excesses, and in which the condition is one of temporary existence.

The beautiful physiological researches of Sir Charles Bell, MM. Flourens, Longet, Magendie, and others, render it highly probable that the cerebellum is the organ by which motorial impulses from volition are combined, and rendered effectual in the attainment of definite ends ; the cerebellum moulding, as it were, the power which is supplied by another source in conformity with, and under the direction of sensational guidance. In the cases to which reference is now made, it can hardly be that the co-ordinating function is injured *per se*, for visual impressions may afford most accurate direction; but one class of sensorial impressions is suspended, viz., that of muscular sensation.

It appears most probable (especially since this is the first change in cases which subsequently exhibit perfect paraplegia) that the centripetal tract of fibres is affected; and that the locality of lesion is very variable, but that it bears definite and perhaps discoverable relation to the locality of anæsthesia.

CHAPTER XIV.

DISEASES CHARACTERISED BY THE COMBINATION OF INCREASED AND DIMINISHED FUNCTION.

THE most important chronic diseases of the brain, and nervous system generally, present this combination of exaggerated activity in some portions, and diminished function in others. The effect of an organic lesion (*e. g.*, a tumor, or deposit) upon function is determined partly by the time and manner of its development, partly by its degree, and partly by the secondary dynamic changes which it may set up. If the development is very gradual, there may be merely the signs of irritation, induced from time to time by dynamic vascular conditions, and represented phenomenally by pain, spasm, and sensorial hyperæsthesiæ. If the morbid change is rapidly, or suddenly effected, or if it has gradually passed beyond a certain limit, there may be the diminution of function, or its complete arrest, and anæsthesiæ and paralyses are the symptoms. And, further, the nature of the organic change may be such that it destroys some vital properties, and leaves others unaffected; or it may be so situated as to sever the functional continuity of organs, and place each in a state of irritation, or exalted activity in respect of other and independent properties. Thus, disease of the spinal cord may obstruct the passage of sensational and (voluntary) motorial impulses; but at the same time, induce reflective exaggeration in the parts below, and hyperæsthesiæ in those above, the seat of lesion: or a tumor in the encephalon may cause volitional paralysis, with acute pain in the head, or delirium, and convulsive or spasmodic seizures.

The diagnosis of organic lesion is framed in no one case by any special or pathognomonic symptoms; but (as in regard of the acute diseases) by the mode of their development, their combination, relative proportion, and the order of their sequence, taken in conjunction with certain extrinsic (general or local) phenomena.

Two of the diseases which are presented for examination, are in many instances (so far as can be ascertained) dynamic; and the reasons have already been given (see Chap. XI., p. 143) for their position among chronic diseases of the brain. In treating of each separately it will be shown that their proper place is among those affections whose consideration forms the subject of the present chapter.

Those of which the diagnosis is now attempted are,—

I. Hysteria, and allied affections, catalepsy, &c.
II. Epilepsy, "le haut," and "le petit mal."
III. Tumor of the meninges, cerebrum, and cerebellum—
    1. Carcinomatous } sometimes separable.
    2. Tuberculous }
    3. Aneurismal, fibroid, hydatid, &c., not separable.
IV. Chronic meningitis.
V. Chronic softening.
VI. Induration of the brain—
    1. In the adult (from epilepsy, lead-poisoning, &c.
    2. In the child. (Hypertrophy of brain.)
VII. Chronic hydrocephalus.
VIII. Urinæmia.

§ I. HYSTERIA.

The nosology of hysteria is so confessedly undetermined that a discussion of its position in this treatise would be quite out of keeping with the general scope and intention of the book. This may, however, be said, that whether it is, in respect of its origin, a primary or secondary neuropathia, it is, phenomenally, a nervous disorder, and hence forms part of the subject-matter of this work; further, that its course is chronic; and lastly, that all the nervous functions are involved, and present every variety of alteration.

Although the most characteristic features of hysteria are certain motorial changes of a convulsive nature, there are other morbid conditions more persistent, and of great importance in arriving at its diagnosis. The presence of the former (paroxysmal attacks) being the demonstration of developed hysteria, such precursory symptoms as may occur have to be considered as prodromata; but if the disease is viewed more generally, and the convulsive seizures are regarded as being only the occasional (although extreme) phenomena of a persistent derangement, which reveals itself at other times by various and complicated symptoms, these, whether intercurrent or precursory, in respect of time, are essential features of the hysteric condition, and should not be placed among the prodromata. It is, however, convenient to consider some of them separately, and only such will be referred to as are of real importance in the diagnosis.

1. Precursory conditions and phenomena.

a. Extrinsic (or general and systemic).

i. Sex. The female sex is by far the most prone to hysteria; and, according to some, the disease is exclusively limited to that sex. This statement is, I believe, essentially erroneous; there are cases presenting every symptom of hysteria in the male, and it would be absurd, on account of some preconceived pathological dogma, to separate such cases from their evident nosological position. But the rarity of hysteria in the male, and its frequency in the female, are notorious, and are sometimes of diagnostic value.

ii. Age. The majority of hysteric patients present symptoms of the disease between the fifteenth and twentieth years. Sometimes they commence earlier; rarely however before the tenth, or after the thirtieth year; although, when once established, they may persist to a much more advanced period.

iii. Condition. The unmarried (or continent) state is apparently a predisponent: and we may also reckon among the general conditions, sometimes of assistance in the diagnosis, town-life, luxurious or lazy habits, dissipation (with its moral and physical effects), warmth of climate (or the spring and summer seasons), and hereditary predisposition.

iv. Morbid states. The most important are uterine disturbances, such as amenorrhœa, dysmenorrhœa, menorrhagia, &c.

b. Intrinsic prodromata resolve themselves into slightly developed degrees of the symptoms persistent after, or present between, the attacks; such as cephalalgia, various spasmodic movements, pain in the limbs, irritability of temper, depression of spirits, emotional displays, eructations, globus, &c. &c.

2. Developed symptoms; the most important being,—

a. Intrinsic,—and these of various kinds.

i. Mental. Volition is defective, and misdirected; idea and emotion exhibit excessive activity; and the combination of these two morbid conditions produces most characteristic features. The patient asserts that she cannot control her thoughts, emotions, expressions, or general (involuntary) movements; or that she cannot move this or the other limb, cannot open the eyes, cannot stand or walk; and if she makes the attempt (or apparent attempt) under this impression, she certainly fails, and may simulate real inability so aptly that it seems almost incredible that the real source is defective will: but should some strong motive, or emotion, or sensation come into operation, and the patient for a moment forget her condition, she may clap the moveless hands together, open the hitherto closed eyelids, and, with the rapidity and energy of robust health, run across the room, or up the staircase, with her quasi-palsied limbs. This kind of simulation is by no means uncommon, but I must most distinctly state that I do not believe there is necessarily any intentional deception practised by the patient upon any one. It is the will which is in a morbid condition, and the patient personally believes in the reality of her symptoms. Volition is defective in relation to idea, but ideation is often excessive; there is a kind of delirium, in which nonsensical sentences are pronounced in an excited manner; and sobbing, sighing, and laughing, are alternately produced. Sometimes volition and ideation are apparently in abeyance for a time; or there may be somnambulism and extasis. Hysteric coma is a rare phenomenon, but one which sometimes occurs; its diagnosis is established by the recognition of preceding hysteric symptoms, and especially the convulsive. (See Motorial Symptoms.)

Emotion is commonly excessive, both in respect of the patient's own feelings and their expression; and she is hurried from one extreme to the other with marvellous rapidity. Laughing and sobbing not only alternate, but sometimes accompany each other, and they are quite free from any volitional restraint. Often there is an inane expression of the face, an utter listlessness, and abstracted look, as if the individual cared nothing for the things of time and sense; and this accompanies restlessness and impatience of temper, with monosyllabic talking.

ii. Sensorial. True hyperæsthesiæ occur not unfrequently; but various metæsthesiæ are more common. Cephalalgia is almost invariably present, with muscæ, tinnitus aurium, and every modification of the special senses. There is also epigastric constriction; the globus hystericus; and pains in the left mammary region.

Hysterical pain is always intense, "horrible," agonising, &c., and it is mainly increased by the direction of consciousness to its perception. The patient shrieks if the skin is touched, but withdraw her attention by conversation, and somewhat rough pressure may be applied without any notice being taken. Articular pain is not accompanied by swelling or deformity of the joints: and it is increased more readily by excitation of the surface than by movement, or succussion of the limb.

iii. Motorial phenomena exhibit endless variety; and, generally speaking, there is an excess of motility in relation to idea, emotion, sensation, and reflex stimulation, whereas voluntary movements are performed sluggishly and imperfectly.

There are, however, two prominent groups of motor phenomena, convulsion and paralysis, the former of which is by far the more common.

a. Convulsion. Hysteric attacks resemble, and may be mistaken for epileptic, or eclamptic; but their differentiation is in the majority of cases easy. They are almost always presented by the female; and rarely occur except at the time of puberty; frequently attend the menstrual periods; are preceded by the hysteric prodromata; can be to a certain extent warded off by a strong effort of the will; are accompanied at the onset by constrictive feelings in the throat and epigastrium; by plaintive cries, laughing, and sobbing, which re-appear towards their close; there is probably never complete loss of sensibility and perception; the spasmodic movements are general; the face undergoes little alteration; there is commonly a twinkling movement of the eyelids, and the patient appears to see; there is no marked change of the pupil; there is very rarely foaming at the mouth, or bitten tongue; the attacks are sometimes of considerable duration; respiratory movements become very disorderly; and after the paroxysm has passed, there is no marked stupor, but only general exhaustion; their recurrence during many years is sometimes followed by mania (of a peculiar character); but very rarely (if ever) by dementia.

β. Paralyses are almost invariably preceded by hysteric convulsions, and, from the character of the paroxysms, and the presence of other signs of the hysteric condition, the diagnosis may be very generally established.

b. Extrinsic symptoms are not of any diagnostic value. Those which are most frequent are the following:—nausea, and eructations; with borborygmi, or tympanitis; palpitation of the heart, with syncopal feelings, and sometimes syncopal attacks; frequent micturition of clear, pale urine (most common after the attacks, but by no means characteristic of hysteria, as I have observed it to an equally marked degree after distinct epileptic seizures in the male); disordered or perfectly healthy digestion; and, more commonly than any other disturbances, uterine irregularities, such as those already alluded to in the paragraphs upon prodromata.

CATALEPSY sometimes occurs as one of the phenomena of hysteria; it differs from the latter, however, in affecting the two sexes with about equal frequency. I have observed a cataleptic condition in cases of chronic ramollissement of the brain, and in tubercular meningitis; and Dr. Laycock has very beautifully compared it to the state presented by so-called "brown-study."*

Its essential features are pathognomonic—viz., the removal of perception and volition; and the persistence of the limbs in a state of balanced muscular contraction; so that they retain the position in which they were placed at the commencement of the attack. They may, however, be made to assume other postures by passive motion (*i.e.*, induced from without), and to retain the most volitionally impossible attitudes for hours, or even for days.

§ II. EPILEPSY.

The tendency of the present time is to connect the phenomena of so-called epilepsy with pathologico-anatomical lesions of very various kinds; such as diseases of the brain, and its meninges; tubercles, tumors, chronic inflammation, &c.; diseases of the kidneys, inducing urinæmia; diseases of the blood, of no very distinct nature; certain general dyscratic conditions, specific (such as syphilis or scrofula), and non-specific (such as general debility), &c. &c. The tendency is of no questionable utility if it proceeds so far as to reclaim from one large and ill-defined group many cases (only half comprehended by their detention in such a category), and to place them in their proper position, among the extrinsic and intrinsic diseases: but it is unquestionably injurious, if it leads to the denomination, by the word epilepsy, of many affections differing widely in the general course of their symptoms, and in the nature of their anatomical conditions; and only agreeing in this, that they present a somewhat similar group of paroxysmal phenomena, those of the epileptic or rather epileptoid seizure.

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* Nervous Diseases of Women, p. 316.

If we can succeed in distributing all the cases hitherto known as epilepsy among the several classes of better defined diseases, we ought to reject the term epilepsy from our nosology; but if we cannot accomplish this distribution, and are compelled to recognise the existence of many, or even of a few, cases distinct from any more general condition of systemic or local disease, then we must employ the term (epilepsy) in a restricted sense, implying only those cases which, in the present state of medical science, are irreducible.

Notwithstanding the reduction which has proceeded within the last twenty years, owing to the progress of pathologico-anatomical research, and its results, there are many cases in which the epileptic phenomena have recurred during a long period, and of which the post mortem examination (death having taken place by some intercurrent affection) reveals nothing to which the symptoms can be referred. We cannot, therefore, do away with this, or some word to denominate these cases; but it is of most essential importance that we should apply it to no others. Endless confusion must follow from such expressions as renal epilepsy, epilepsy from tumor of the brain, or meningitis; gastric and uterine epilepsy, &c. &c.; since it is from cases of urinæmia, from tumors of the brain, and from every other distinctly recognised pathologic condition that the disease epilepsy has to be diagnosticated.

Idiopathic epilepsy has been placed among the diseases of the brain, because one of the most marked groups of phenomena, occurring both during the paroxysms and in the interparoxysmal period, is referrible to the cerebral functions (loss of perception and volition in the attacks, and diminution of volition, attention, and memory in the interparoxysmal state): and it has been placed in the category of affections marked by the diminution of some properties, and the excess of others, because this combined character is presented (in the loss of mind and excessive motility) during both the attacks themselves, and the intervals of their recurrence.

The diagnosis of epilepsy (idiopathic) is to be framed from a consideration of the characters of two periods.

A. Interparoxysmal phenomena; and by this term I do not intend the immediate prodromata, or sequelæ of the attacks, but the condition of the patient when quite free from their occurrence. Sometimes the symptoms are extremely characteristic; sometimes the deviations from health are slight, and it is then principally (and at all times importantly) by their negativeness, that they are of value, by enabling us to exclude extrinsic and (structural) intrinsic diseases.

1. Intrinsic symptoms, of two classes.

a. Mental. In respect of their intellectual state, by far the greater number of epileptics exhibit deficiency of volition in its relation to thought, emotion, sensation, and motility. (See Chap. II., p. 15, *et seq.*, for explanations of these relationships.) The mind is wandering, half abstracted, and without energy of purpose; there is little or no power of attention, and, as a consequence there is slowness of apprehension and defective memory; the emotions and their expression are undirected and uncontrolled; the patient can give only unsatisfactory, and often totally unmeaning accounts of his sensations; he feels something wrong, but hardly knows where it is; and when he can point out its situation (in the head, thorax, abdomen, or limbs), is very rarely able to say what it is like; there is at the same time a sluggishness and clumsiness of voluntary movements; the walk and manner of the patient are ungainly, he stumbles over objects in his way, and has often a peculiarly gauche and awkward appearance; involuntary movements, such as starting upon the occurrence of sudden noises, &c. &c., are uncontrolled; and there is a dull, expressionless, or morose countenance.

These phenomena may be very slight, and may escape notice: they may in many cases be overcome by an education of the will; but in other cases they are extremely well marked, and graduate into utter stupidity and dementia, with general paralysis. They are not unfrequently combined with a somewhat antithetic condition of idea and emotion, considered as separate properties; and then a rapid but rambling succession of thoughts and feelings is present, and may find utterance, constituting a quasi-delirious state.

The symptoms referred to are generally increased in intensity, either immediately before or after the attacks; it is commonly observed that the deficiencies are more prominent as the sequelæ, and the semi-delirious phenomena as prodromata; but this is not without exception; and I am perfectly convinced, from careful examination of the subject, that these mental phenomena are not to be considered as simple consequences of the attacks.

b. Motorial. The symptoms are those already enumerated, as characteristic of reflective action in excess (see Chap. II. p. 36), and as being presented by the subject of idiopathic convulsions. (See p. 128.) They are tremor, rigors, and clonic spasms, and are to be found in the great majority of cases. Sometimes they are slight; but sometimes they are very highly marked and excessively annoying. In several cases I have noticed choreiform movements of considerable intensity. There is very commonly an excess of emotional and sensational motility, which is enhanced by the (positively) defective amount of volition. Beyond this there is no motorial change, such as paralysis or tonic spasm.

Dr. Marshall Hall has directed attention to the occurrence of spasmodic contraction in the muscles of the neck (trachelismus), which he considers to be, in some cases (the "tracheleal"), an important link in the production of the fits. It is quite certain that trachelismus occurs in some epileptics, and that it may (by impeding the return of blood from the head) induce temporary congestion; but I have very rarely found that epileptics suffer from trachelismus during the intervals of their seizures; and although it is sometimes highly marked at the onset of the attacks (when spasm is universally present), I have observed many cases in which the tracheleal muscles were quite flaccid, notwithstanding the darkness of face and leaden hue of the body generally.

c. Sensorial phenomena are by no means characteristic. Sometimes, but, so far as I have seen, rarely, the patient complains of cephalalgia and vertigo; creeping feelings, numbness, &c.

2. Extrinsic symptoms of idiopathic epilepsy are by no

means striking. I have seen almost every variation within the range of ordinary health, and can by no means concur in the statement that there are either constantly, or very frequently present, the signs of general organic debility. Epilepsy occurs in the robust as well as in the feeble, but probably with greater frequency in the latter; and this common association (of debility and spasm) has been made the basis of an ingenious theory of the disease by Dr. Radcliffe.*

Some morbid extrinsic conditions, when once developed, are persistent; others are occasional. Among the former we must range a general depression of vital energy, characterised by toneless muscles, a feeble pulse, cool skin, and dusky tint of surface. Among the latter we find every variety of irritation; such as that from cutting the teeth (either the first, second, or dentes sapientiæ), dyspeptic disturbances, constipated bowels, uterine irregularities, &c. &c.

In respect of distinct prodromata little can be said; epilepsy affects the two sexes about equally (being rather more common in the female than the male), and it may occur at any period of life. Its most frequent occasional cause appears to be emotional shock, such as sudden fright or alarm. There is perhaps some hereditary influence active in the production of a few cases, but it is undiscoverable in the majority; and many of the conditions commonly considered to occupy some causative relation to the disease, have probably no specific action, but merely conduce to general organic derangement.

B. Phenomena of the paroxysms. Apart from any theories, with regard to their causation, we cannot fail to recognise two or three varieties of attack. The distinction by the French authors into "le haut" and "le petit mal," is one which we may readily apply and find useful; but it is not sufficiently definite to answer every purpose. Dr. Marshall Hall describes abortive and syncopal forms of attack as contrasting with the more developed paroxysms, which he considers either laryngismal, or trachelismal, in their origin. It would be very interesting to recount the various explanations of epileptic fits which have been given and received at various periods; but it does not form any part of my present object to occupy space with such details. Premising only that the essential features of the epileptic paroxysm are the combination of spasmodic muscular contractions, with loss of perception and volition; and that this occurs as a paroxysmal event, we may at once recognise a distinction of the attacks into two groups.

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* Epilepsy and allied affections.

1. Those marked by equal derangement of the mental and motorial functions, or by complete loss of consciousness, and violent spasmodic movements; "le haut mal," of the French authors; the laryngismal and tracheleal epilepsy of Dr. Marshall Hall.

2. Those in which one element predominates much over the other, or even to its entire exclusion; and these are necessarily subject to further division into,—

a. Attacks in which the loss of perception and volition is complete, but in which there is little or no spasmodic movement; some trifling tremor, or general twitching of the muscles (producing no locomotion of the limbs) taking its place. This class includes "le petit mal," or "vertige epileptiforme" of the French, and the syncopal attacks of Dr. Marshall Hall.

b. Attacks in which there is marked spasm of the muscles; sometimes general, but more commonly partial (and then affecting the neck and upper limbs with the face most frequently), the spasm being of somewhat tonic character, but attended by no loss of perception and volition, or at the most by some slight obscuration. These seizures constitute the "abortive" attacks described by Dr. Hall.

That the nature of the paroxysmal phenomena cannot be made the primary basis for a classification of epileptics is at once obvious from the fact, that one individual frequently presents every variety: but, on the other hand, either form may exist alone, and may therefore constitute true epilepsy.

1. The diagnosis of the first form of attack is by far the most easy, the disease can rarely be confounded with any other. Its essential features are,—

i. The absence of any necessary prodromata (such as those described as preceding the hysteric convulsion, or the signs of congested brain).

ii. The simultaneous occurrence of the following symptoms,—

- α. Complete loss of perception and volition.
- β. General quasi-tonic contraction of the muscles.
- γ. Impeded respiration (probably differing in its mechanism in different cases).
- δ. Darkened face, and surface generally, with distended jugulars.
- ε. Dilated pupil, distorted features, throbbing carotids.

iii. These phenomena being quickly followed by,—

- α. Persistent unconsciousness.
- β. Clonic, violent contraction of the muscles.
- γ. Laborious respiration, with tracheal gurgling noises.
- δ. Slight return of colour in the face and body generally.
- ε. Oscillation of pupil and eyeball; chewing movements of the jaws, with foaming at the mouth, often of bloody tint.

iv. The cessation (gradual) of iii. and the production of another stage, marked by the following characters,—

- α. Some return of perception and volition for a short time; with an aspect of astonishment, alarm, or suspicion; and this followed by drowsiness, or profound coma.
- β. Occasional half voluntary (or sensational?), half involuntary movements, such as change of position, &c.
- γ. Laboured, slow respirations, with stertor and tracheal rattle.
- δ. Paleness of face, coldness of surface, with perspiration.
- ε. The pupil often contracted; and the conjunctivæ injected.

v. After sleep of variable duration and profundity, the patient becomes more natural in his manner; feels some headache and general soreness, but exhibits (*i.e.*, in idiopathic epilepsy) no paralyses, anæsthesiæ, nor any intrinsic phenomena characteristic of organic disease.

2. The diagnosis of the second form of attack is rendered

easy when either of its subdivisions occurs alternately with the first; under other circumstances there may be considerable difficulty.

a. " Le petit mal" may be confounded with syncope; but it is to be distinguished by the greater suddenness of its appearance; the absence of syncopal prodromata; the complete loss of perception and volition; the slightly darkened lip, and generally pallid face, not so absolutely blanched, however, as in syncope; and further, the pulse is extremely feeble, but not absent as in the latter; perception and volition return more quickly; and there is generally some spasmodic movement of slight extent. Between the attacks, and after their repeated occurrence especially, the signs of mental decay are usually well marked; and there are the phenomena of depressed organic vigour.

b. Abortive convulsive seizures may be diagnosticated from other diseases by their distinctly paroxysmal occurrence; the patient during their intervals presenting no signs of intrinsic disease; and more especially by their alternation with distinct epileptic seizures.

In the foregoing paragraphs I have intentionally omitted the so-called "epileptic cry," because it is frequently absent. Urine is often passed as copiously after these attacks as after hysteric; but having examined it in many cases I have failed to detect albumen in any one instance in which albuminuria did not exist as a chronic condition; and which cases do not form examples of idiopathic epilepsy.

Considering epileptics apart from the peculiar form of their attacks (which varies in the same individual), they may be divided into three large groups, easily recognised by the following characters.

A. Those who present no deviation (*i.e.*, positive deviation), from the condition of mental or organic health.

B. Those whose minds exhibit marked degeneration.

C. Those in whom the organic processes (although presenting no evidences of distinct and tangible disease), are performed in an inefficient or perverted manner.

It is common to find, closely associated with the second class, patients in whom there are (in addition to mental failure of the negative character already pointed out, p. 175), the signs of intrinsic organic diseases of the nervous centres. The signs referred to are pain, paralyses, anæsthesiæ, tonic contractions, delirium, delusions, &c.; the cases thus marked are not instances of idiopathic epilepsy; and their diagnosis must be attempted by a consideration of the points adverted to in the following sections of this chapter. It may be that epilepsy is secondarily induced by some of these diseases, or *vice versâ;* and, although an accurate differentiation is not possible in all cases, it is to be attempted during life, and should always be borne in mind when endeavouring to interpret symptoms by the aid of post mortem examination. Wherever, on the other hand, we find epileptoid symptoms in persons presenting distinct organic disease of extrinsic character, we should ascertain whether the latter can directly account for the former. If so, the disease is not epilepsy, but epileptiform convulsions attendant upon eccentric disease. If the latter is of such a character that we cannot, upon any known pathological grounds, attribute the convulsions to a direct influence of the morbid condition upon the nervous system (as is the case in urinæmia, &c.), but only to a secondarily induced state of the centric organs, the disease is epilepsy; and we have then to consider carefully what part has been taken in its production by the deranged organic condition on the one hand, and by an idiopathic tendency on the other.

There is but one more remark to be made upon this obscure disease, and it is upon the relation between the inter-paroxysmal period and the attacks themselves. When the patient belongs to the first category (A.) the attacks are commonly of the kind first described, viz., the combination of mental and motorial disturbances in their most intense form: when the patient belongs to the second group (B.), his attacks are most frequently those of "le petit mal;" and these are also very often observed in those of the third class (C.): when the patient presents the characters of the third group (C.) the attacks are of very variable kind. The third form of fit (described p. 178) is much less common than the other two, but it may occur as an occasional phenomenon in any case.

These statements present the general results of examination into a large number of cases, but they are general only, and are of course subject to many exceptions.

§ III. TUMOR.

In considering the diagnosis of tumor, it is convenient to reverse the order of topics usually adopted, and to describe, first, the general bases for belief in the existence of such a lesion; secondly, the reasons for judging of its nature anatomically, and how far this is practicable; and thirdly, the means by which we infer the locality it occupies.

A. *The diagnosis of tumor generally;*—and more especially from chronic softening, and chronic meningitis.

1. Intrinsic symptoms (very variable; but often conclusive by the peculiarity of their combinations).

a. Mental. These are of two kinds; some resulting from excessive or irritated action, and others from the reverse; or they may be absent altogether.

i. Increased action, in relation to idea is sometimes, though very rarely, observed (two of forty-four cases—Abercrombie). The delirium which occurs is mild and inoffensive, and consists of the confusion rather than exaggeration of thought. When marked delirium is present, there is most probably meningitis, or hyperæmia cerebri as a concomitant phenomenon. Irritability of temper may exist.

ii. If convulsions occur, there is commonly loss of perception and volition, followed by moribund coma; and this form of diminished mental action exists in about half of the cases of tumor, for two or three days before death. Partial losses of memory, and generally enfeebled intelligence, with depression of spirits, are the most frequent symptoms. In the majority of cases intelligence is intact.

b. Sensorial phenomena, of two kinds.

i. Metæsthesiæ (or modified sensations) are the most common symptoms, and cephalalgia is often the most characteristic. It is slight at the commencement, but afterwards becomes of great severity; is confined to a definite point or region of the head, and persists in the same locality; it undergoes occasional exacerbations of almost intolerable suffering, eliciting from the patient agonising cries, but is rarely absent altogether during the intervals of paroxysm; it is augmented by intellectual or physical exertion, by emotional disturbance, by sensational impressions, and by forced respiratory movements. It is sometimes almost the only symptom, but in a few recorded cases it has been altogether wanting.

Certain dysæsthesiæ (see p. 30) are often present; and they are erroneously placed under the name hyperæsthesiæ, the latter being excessively rare, although occasionally observed. The most common variety of dysæsthesia is that (already alluded to above as one of the characters of cephalalgia) in which sensorial impressions augment the intensity of pain in the head; and hence patients with tumor close the eyes, and bury their heads under the bed-clothes, to avoid the light and sounds of the room.

There are also various modifications of sensibility, such as pains in the limbs, numbness, formication, &c. &c., of common occurrence, but of no distinctive character. Vertigo is frequent, but its special relationships have yet to be discovered.

ii. Hypæsthesiæ and anæsthesiæ of variable extent and intensity are induced either suddenly or gradually; more commonly the latter. The sense of sight is often lost in one or both eyes, and this is found more frequently than deafness, or anosmia. There may be simple mistiness or imperfection of vision, with dark or bright spots before the eyes; or there may be complete double amaurosis. The iris does not often lose its irritability. Cutaneous sensibility is sometimes diminished in particular regions, but it is rarely lost.

c. Motility. In the cases which have been placed on record, convulsions have occurred more frequently than paralyses; and among those which have presented the latter, one half have exhibited the former.

i. Convulsions occur not unfrequently for a few days before death, sometimes at an earlier period, and they are commonly of epileptoid character. When no general paroxysms have been present, there are often clonic spasms, or tonic contractions, of limited groups of muscles; sometimes shifting their place, but not to so marked a degree as in urinæmia, meningitis, &c.

ii. Paralysis. Articulation is sometimes impeded without any further implication of motility: the muscles of one eye may be paralysed, and every other part of the body retain its motor functions. In some cases hemiplegia, and much more rarely paraplegia is present. The paralysis is generally slowly and imperfectly developed; and may be preceded by pain in the limbs. Sometimes, but much more rarely, it is produced as an apoplectic phenomenon. (See Chapter VII., § v., Tumor, p. 105.)

2. Extrinsic symptoms. These, although sometimes wanting, may constitute almost the only, certainly the most prominent, features of a few rare cases.* They are, — heat of head, general febrile irritation, with anorexia, vomiting, and constipation. There is commonly paroxysmal head-ache, or the vomiting occurs in the morning without previous head-ache, or sense of nausea. Society and diversion commonly increase the disturbance, which (as Abercrombie remarks) is not the case in dyspeptic head-ache.

It is of great importance to recognise the general or constitutional state of the patient; to exclude the existence of urinæmia, and in some other cases to determine the presence of a tuberculous or carcinomatous dyscrasia. But in many instances nothing distinctive can be discovered from extrinsic symptoms; the only deviation from health being general debility and exhaustion, the result of long continued pain, and mental depression.

Tumors on the scalp, or in other regions of the body, such as glandular (tuberculous) swellings, scirrhus, aneurismal dilatation of vessels, &c., would enhance the probability of intracranial growths; and they would be of especial value when of those kinds which are dependent upon some general dyscratic condition.

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* Abercrombie's "Practical Researches," p. 337, contain a graphic delineation of cases of this kind.

3. Combination of symptoms, and *resumé.* The existence of an intracranial tumor would be rendered highly probable, if in a certain case we found—violent, paroxysmal, limited cephalalgia; with loss or imperfection of vision; without motor paralysis or with partial paralysis, slowly and imperfectly developed. If, says Durand Fardel,* there are joined to these symptoms epileptiform convulsions, without paralysis in their intervals, the probability of tumor is still greater; and this is especially the case if articulation and the intelligence remain intact.

B. *The differentiation of tumors, in respect of their special character.*

There are no centric signs by which this may be accomplished; it is a matter of inference only, based upon the consideration of extrinsic symptoms.

1. Tuberculous deposit (*en masse*) is the most common form of tumor existing in the child or young adult; and we might infer its presence, if we found distinct evidences of the scrofulous diathesis, either in the hereditary antecedents or actual condition of the patient. Negatively this test is of greater value than positively; since after puberty a healthy state of the lungs is rarely coexistent with deposit of tubercle in the cranium, or elsewhere.

2. Carcinoma. The general probability of this form of tumor is in direct proportion to the age of the individual; but carcinoma may exist at any period of life. M. Rostan draws attention to the occurrence of lancinating pain in the limbs of persons suffering from carcinomatous tumors of the encephalon;† but this is not of any real value, either positively or negatively. The only signs upon which any reliance can be placed are,—the presence of a cancerous cachexia, and the coexistence of tumors elsewhere, and especially of such as affect the integuments and bones of the skull.

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* Maladies des Vieillards, p. 144.

† Recherches sur le Ramollissement, p. 404.

3. Aneurism might be inferred if similar arterial disease were demonstrable in other regions of the body.

4. Other forms of tumor can only be guessed at from the absence of any signs of the three already mentioned, and the occasional discovery of peculiar growths (such as hydatids, fibrous tumors, &c.) in other organs. Post mortem examination, and this of microscopic character, can alone reveal their true nature.

C. *Diagnosis of the special locality of tumor.*

It is utterly impossible, in many cases, to arrive at any certainty upon this point; still there are some data by which the localisation may be carried to a certain degree.

1. Differentiation of the two sides (right or left hemisphere). The pain is most commonly situated on the same side as that in which the tumor exists; but this is not without exception. Motor phenomena (both spasmodic and paralytic) are observed almost invariably on the opposite side. The special senses (cranial) are affected on the same side.

2. Differentiation of anterior and posterior lobes or their meninges. The locality of pain is of some service, but its indications amount to probability only, since frontal cephalalgia may arise from cerebellar tumor. Upon analysing a considerable number of cases, I find that convulsions are most frequent in tumors of the cerebellum, and that they diminish in frequency as the seat of lesion advances forwards—*i. e.*, through the posterior and middle to the anterior lobes of the cerebrum. Amaurosis, on the other hand, is most common in tumors of the anterior cerebral lobes; and it becomes relatively less frequent as the seat of tumor retrogrades. The same is true to a certain extent with regard to impaired intelligence and articulation.

3. Distinction of upper surface and base. The implication of special senses generally (but not exclusively) indicates a location near the base; its absence does not preclude the possibility. Romberg has hinted at an important method (if confirmed) to accomplish this differentiation.* He asserts that in cases of

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* Manual of the Nervous Diseases, Syd. Soc. Trans., vol. i., p. 159.

tumor affecting the upper surface, forced expiration increases the pain; whereas, when the base is their locality, this effect is produced only by inspiration; and this he readily explains by the alternate rising and falling of the brain, during the respiratory movements, causing pressure of the tumor against the walls of the cranium. A case which I have recently seen of tumor of the base (affecting the cerebellum), confirmed Romberg's statement with regard to the effect of forced inspiration, the pain being thereby much increased, but not at all by expiration.

4. Diagnosis of meningeal from cerebral tumors. It is commonly stated, that the former are especially characterised by pain and irregular convulsive movements; whereas the latter are attended by less pain, but with sensorial disturbances, paralyses, and intellectual failure. The data, however, upon which this statement is founded, are unsatisfactory; and by far the greater number of tumors must necessarily affect both the nervous substance and its meninges at the same time, although commencing sometimes in one and sometimes in the other.

5. The differentiation of special portions of the cerebrum, or cerebellum, as the seat of tumor, is at present impossible, although some facts are recorded which tend to show that this may be accomplished hereafter. Paraplegia rarely occurs from encephalic tumor, unless the cerebellum is its seat; and various forms of vertiginous and allied movements are found to coexist with disease of the sensori-motor ganglia, the cerebral, and cerebellar crura. We need, however, much more accurately recorded observations, and a greater number of them, to arrive at any certainty with regard to the effects of lesion in these several parts.

§ IV. CHRONIC MENINGITIS.

The cases hitherto placed on record have usually presented chronic meningitis in complication with other diseases. Calmeil's beautiful Treatise upon Paralysis in the Insane,* contains examples of inflammation occurring towards the close of life in the subjects of dementia, and hence the symptoms of the latter have masked or altogether hidden those which are the appropriate phenomena of the former. Again, chronic meningitis frequently accompanies the development of tumors, and it is difficult to determine which symptoms belong to one and which to the other lesion, although some approximative correctness may be arrived at occasionally.

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* De la Paralysie considérée chez les Aliénés.

The term chronic inflammation, although consecrated by usage, is pathologically inapplicable to the static conditions implied, and is probably injurious in its influence upon therapeutics. Hyperæmia is a less important element of the disease than exudation and perverted nutrition; there may be some local and general irritation (or increased activity) as the result of these static changes; but there is not the systemic state of true inflammation. The anatomical results, discovered post mortem, are—thickened membranes (by the deposit of fibrinous matter, interstitially or superficially), adhesions of contiguous parts (dura mater and bone, two layers of arachnoid, &c.), osseous deposits, sub-arachnoid infiltration, and these with or without vascular changes (such as increased injection of various kinds), or any distinct signs of perverted nutrition (such as tubercle, carcinoma, &c).

The symptoms of meningitis, in the chronic form, are by no means so distinctive as when they occur in the acute; they are the following:—

1. Intrinsic (sometimes the only phenomena).

a. Mental. The most common feature, at an early period, is great irritability of temper, with restlessness: to this succeeds occasional, mild delirium at night, with loss of memory, and impaired power of attention and apprehension during the day. Subsequently there is increased dulness of intellect, and in many cases complete fatuity. The mental deterioration, in many instances, takes place as the immediate sequence of convulsive attacks (of very variable character), each one leaving the patient somewhat more confused, and less able to control his thoughts, words, and actions, than he was before. It is very rare for the mind to retain all its faculties; and although in some mild cases it is unimpaired (motorial and sensorial phenomena having occurred alone), in a great number of instances its changes are the most prominent, the first to appear, and the most characteristic throughout.

b. Sensorial. Pain in the head is almost universally present; it is of dull, diffused character; is not liable to the severe exacerbations of pain from tumor; is not limited so accurately to one spot; and it is exaggerated especially by organic disturbances, such as dyspepsia, general malaise, &c. Vertigo is commonly complained of, and sometimes it is so severe that the patient may fall to the ground, without any distinct loss of consciousness (*i.e.*, of perception). True hyperæsthesiæ are by no means uncommon; the patient sees, hears, and feels with abnormally exaggerated acuteness; and often the sensorial process, especially when impressions are intense, is attended by pain (dysæsthesia). In rheumatic subjects, pains in the limbs are frequent, and movement of the eyeballs, or of the frontal muscles, is painful. Hypæsthesiæ and anæsthesia occur after some time; the sight or hearing (for example) becomes confused and deficient, or may be lost altogether; and there are modifications of cutaneous sensibility, ending in its deficiency.

c. Motorial. The commonest features are,—disorderly spasmodic movements, in combination with local or general paralyses. Muscles of the face, tongue, and eyeball are peculiarly prone to suffer at an early period; producing (phenomenally) grimaces and distorted features, with strabismus and diplopia, or difficulty of articulation. Paroxysms of convulsions occur, and these may be epileptiform in type, but more commonly they are of anomalous character; the patient may or may not lose consciousness; there is little respiratory disturbance; and the spasmodic movements are partial (or local) in their distribution; of no great intensity, but of considerable duration. There is not, as a rule, the marked sopor, or coma, which follows the paroxysms of epilepsy.

Paralyses are generally limited to particular groups of muscles, rarely affecting more than one limb (*i.e.*, rarely assuming a complete hemiplegic or paraplegic form); and they are very commonly associated with tonic contractions of the flexor muscles, and increased sensibility of those muscles to the irritation of percussion.

2. Extrinsic symptoms. These are of no marked character; being, for the most part, heat of head, flushing of face, injection of conjunctivæ, vomiting, constipation of bowels, nausea, and nocturnal febrile excitement. They are more marked, however, than in tumor or softening.

It is important to exclude the presence of such elements as urinæmia, and to estimate the ætiologic value of such circumstances as,—blows upon the head, disease of the bones, or proper sensory organs, and the existence of dyscrasiæ, such as tubercle, syphilis, rheumatism, &c.

§ V. CHRONIC SOFTENING.

This condition of the brain may be the result, or at all events the sequence, of an acute apoplectic seizure, whether the latter has had, for its anatomical basis, hæmorrhage, softening, or congestion; and when thus occurring, its diagnosis is substantially that which was pointed out in Chapter VII. p. 117. When, however, it is idiopathic in its mode of origin, and chronic in its course from the commencement, it may be recognised by the following characters:—

1. Intrinsic symptoms (alone of positive value).

a. Mental. There is diminution of intelligence. At first, apprehension and attention are enfeebled, and the individual is incapable of receiving any new ideas. Subsequently, memory is impaired: the patient cannot recollect past ideas, and there is consequently general confusion and incoherence. This condition is sometimes, but rarely, accompanied by a certain degree of excitement, revealing itself as delirium; more commonly there is a monotonous dwelling upon one idea or group of ideas; the patient repeating the same word, sentence, or action, over and over again, by the hour together.*

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* Thus, I have seen a man employ himself for hours and days successively in carefully arranging the bed-clothes, and this with an air of great gravity and importance.

In regard of emotion the majority exhibit dulness, or some degree of melancholy; and it is not uncommon to find that the expression of feeling is very little under control. In other cases laughing and crying are very common; but they occur without assignable cause, and without the apparent existence of any correspondent emotion. In the first case volition is defective in relation to emotion (see p. 17); in the second motility is excessive in dependence upon the latter. (See p. 34.)

The intellectual weakness increases and the patient becomes drowsy. At first he may be aroused, but subsequently there is profound coma, and the patient dies comatose. In rare cases, however, the intellect may be preserved throughout. The gradual failure, one by one, of the intellectual faculties is, *per se*, one of the most characteristic symptoms; and the peculiar monotony (of word or action) has led Durand Fardel to a diagnosis in some obscure cases.

b. Sensorial. i. The most common metæsthesia is cephalalgia. It exists in about half the cases; is felt generally among the earlier symptoms; but sometimes does not commence until an advanced period, and it generally disappears towards the close of life. Its intensity is highly variable, rarely so great as that of meningitis, or *à fortiori* of tumor; its locality is frontal in the majority, and it is not often confined to one side of the head. When pain is not present there is generally a sense of weight and confusion of head; and (as I have observed in many cases), such a peculiar sensation that the patient says he fears his "mind is going."

Painful sensations are often present in the limbs; and they are sometimes referred to the surface, sometimes to the muscles, and in other cases to the articulations. These modifications assume the form of so-called hyperæsthesiæ, cutaneous and muscular; or of numbness, formication, &c. They are commonly limited in extent to the parts presenting motorial changes; and when this is the case they are highly characteristic.

ii. Hypæsthesiæ are common, but anæsthesiæ are rare; and, in respect of the former, they usually exist in conjunction with paralyses. These changes are gradual and imperfect in their development; and it is uncommon to find anæsthesia of the special (cranial) senses.

c. Motorial. Unless an apoplectiform attack has taken place, the muscles rarely exhibit any sudden changes; but when such a seizure has occurred, there may be complete (*i. e.*, in respect of extent) hemiplegia; the face, articulation, the tongue, and the limbs of one side being involved in paralysis.

i. Paralysis (to volition) in the typical form of chronic softening is developed gradually; weakness of the muscles preceding their complete removal from volitional control. Hemiplegia is the most common distribution; but there may be general paralysis, incomplete in degree. (This is important as a distinction from the persistent paralysis of hæmorrhage.) At first, one leg drags in walking, or one hand feels less strong than the other, and grasps less firmly. The diminution progresses in an intermittent course; paralysis lasting sometimes for a few minutes or hours, and then the power returning. The motorial changes may, however, be limited to particular groups of muscles; for example, those of the face, of speech, of one arm, &c.

ii. Spasm, of tonic character, exists with great frequency, and may be found in the paralysed, or non-paralysed side; though much more commonly in the former. The rigidity increases gradually, and persists until within a few days of death, when it usually disappears altogether.

iii. Tremors, or epileptoid convulsions may alternate with, or take the place of tonic spasm; or there may be local clonic contractions, and the muscles may be unduly sensitive to percussion.

iv. Tonic paralysis generally occurs for some days or hours before death; and then (paralytic) stertor, involuntary micturition, and universal flaccidity are present.

2. Extrinsic symptoms furnish nothing of positive diagnostic value; they are of service negatively, inasmuch as their absence serves to exclude the idea of Morbus Brightii, or of tubercular deposit in the meninges. Vomiting, mal-mutrition, the existence of disease in the vessels (as inferred from the advanced age

of the patient, the arcus senilis, feeble heart, and rigid arteries) favour the supposition of softening; and advanced age is of importance in rendering the probability of softening much greater than that of chronic meningitis.

3. General *resumé* of diagnosis. When softening has observed a chronic course throughout, its most difficult differentiation is from tumor and meningitis. The three may, however, be distinguished in many cases by the following characters,—

a. Tumor,—intense, locally limited, paroxysmal pain; anæsthesiæ of special senses; local paralyses; epileptoid convulsions without paralyses; unimpaired intelligence; coma at close of life.

b. Chronic meningitis,—pain, not very severe, not limited; mental and emotional excitement; disorderly spasms and paralyses; with frequent, but irregular accessions of fever.

c. Chronic softening,—oppressive, not intense pain; with gradual failure of intelligence, motility, and sensibility.

When softening assumes a chronic form, as the sequela of an acute apoplectic seizure, it is from hæmorrhage that the diagnosis is most difficult; and it is sometimes impossible. In many cases, by reverting to the phenomena of seizure, we may infer the existence of softening, if we find that the rigidity or clonic spasms were present at the commencement, and that the subsequent course has been one of progressive deterioration. If an apoplectic attack occurs without rigidity, and after some hours' consciousness partially returns, but hemiplegia and some mental feebleness remain, we may be perfectly unable (if this state becomes chronic) to determine the precise nature of organic change. The persistence *in statu quo*, or a progressive, although very trivial and slow, amendment, would indicate a probability of hæmorrhage; the slightest deterioration, the appearance of rigidity, or the accession of convulsive movements, would be evidences of ramollissement.

§ VI. CHRONIC INDURATION.

When induration of the brain substance occurs after ossification is complete, there is no change in the size of the organ;

but when the process commences in early life, there is hypertrophy. We have, therefore, to consider separately (inasmuch as their diagnosis is established upon very different grounds) the induration of brain presented by infants, and that presented by adults.

A. HYPERTROPHY OF BRAIN, IN INFANTS. There is nothing distinctive in the purely intrinsic symptoms. They are the occurrence of convulsion; with sensorial changes, such as loss of sight and hearing; intellectual weakness; and paralyses. These follow an extremely irregular course, and sometimes are absent altogether.

The extrinsic condition to which alone any diagnostic value is attached is enlargement of the cranium. The head does not attain so large a size as in chronic hydrocephalus (see § VII.), the fontanelles and sutures are not so widely open. Dr. West observes that the "enlargement is first apparent at the occiput, and the bulging of the hind-head continues throughout especially striking. The forehead may, in the course of time, become prominent and overhanging, but the eye remains deep sunk in its socket, for no changes take place in the orbitar plates, such as are produced by the pressure of fluid within the brain. . . ."* There is no prominence, but actual depression of the anterior fontanelle, and Dr. West remarks that similar depression is sometimes "observable at all the sutures."

There is commonly associated with this enlargement a condition of depraved nutrition generally. Induration of the brain sometimes takes place in children, as the result of lead poisoning, but this will be considered with,—

B. INDURATION OF BRAIN IN THE ADULT.

1. *From lead poisoning.* The intrinsic symptoms produced by lead are so various that it is impossible to do justice to them, as pathological phenomena, in the present work. The diagnosis of lead poisoning, however, rarely turns upon the special character of its intrinsic symptoms; and those which appear to me alone deserving of notice are the peculiar muscular changes. Paralysis is frequently limited to the extensors of the hands and

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* Lectures, ant. cit., p. 97.

fingers. Duchenne asserts that the flexors, the interrossei, and the supinator longus are never affected; and that those muscles which are paralysed present great diminution of contractility and sensibility to faradisation.* It is well known that they very soon diminish in size; but Meyer states that their contractility is lessened before their nutrition is affected.†

Combined with paralysis, there is sometimes increased cutaneous sensibility, with perverted cerebral functions, and various disturbances of motility, such as spasms, tremors, convulsions, &c.

Extrinsic symptoms and conditions furnish the means of distinction ; they may be briefly resumed thus,—

a. Exposure to lead, by trade, accident, or medicine.
b. The precursory symptoms of colic (constipation, pain, &c.).
c. A general state of cachæmia.
d. The blué line on the gums.
e. The effects of hydro-sulphuric acid bath.
f. Presence of lead in the secretions.

2. *Induration of brain from epilepsy*. According to the elaborate researches of MM. Bouchet et Cazauvielh,‡ hardening of the medullary tissue of the brain is the most common anatomical condition to be discovered in epileptics, whose convulsive disease has been accompanied by marked intellectual failure and general paralysis. It is certain that such a static change is not a characteristic of epilepsy, *per se;* and it appears to be related only to the co-existent, or subsequent mental deterioration.

The existence of induration might be inferred from the progress of general intellectual decay—attention, apprehension, memory, and judgment (as exercises of volition), failing; ideation becoming disturbed, and appearing incoherent, or based upon delusions; general paralysis stealing on; and the attacks themselves increasing in frequency, but diminishing in violence.

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* De l'Electrisation localisée, &c., p. 507.

† Die Electricität in ihrer Anwendung auf pract. Med. Abschn. VII.

‡ De l'Epilepsie dans ses relations, &c.

§ VII. CHRONIC HYDROCEPHALUS.

This disease, although, in the greater number of cases, dependent upon meningitis, is not demonstrably inflammatory in all, and its symptoms are not sufficiently characteristic to separate, in every instance, the active from the passive form. Its diagnosis is established mainly upon extrinsic phenomena.

1. Extrinsic conditions and symptoms. In by far the larger number of cases signs of the disease appear before the child is six months old; in many it is demonstrably congenital.

There is intense marasmus, although food may be taken eagerly.

The size and shape of head are, however, the pathognomonic features. The head is large, and increases in size out of all due proportion to the body generally. Its form is globular; the sutures and fontanelles, especially the anterior, are widely open, and pulsating; the forehead is very prominent; the eyeballs are protruded from their sockets; their axes are directed downwards, with frequent strabismus; the upper sclerotic surface is exposed, while the lower half of the iris is concealed by the under lid. There is often rolling movement of the eyeball, with amaurosis; and the face appears peculiarly small, owing to its disproportionate development. The cranial enlargement is general—*i. e.*, there are no elevations of particular portions; neither are there bony enlargements in other parts of the body.

Fluctuation may be felt at the fontanelles, and through the sutures, when distention has become excessive. It has been stated that a murmur may be heard over the fontanelles; but this is not always present, and, when it does occur, is by no means diagnostic of hydrocephalus.

2. Intrinsic symptoms are very variable.

a. Mental. Intelligence may be unaffected; but it is generally enfeebled, exhibiting a peculiar slowness; and, in many congenital cases, there is absolute idiotism.

b. Sensorial. Sight is very frequently lost. Other sensorial changes occur, but they are of no distinctive value.

c. Motorial. Convulsions, or paralysis, or both, may occur in some cases; they may be absent throughout in others.

Some intrinsic symptoms commonly precede the extrinsic, but the diagnosis cannot be established from them alone; neither are there any certain signs by which we can separate external and internal hydrocephalus during life. The former (the collection of fluid in the arachnoid cavity) takes place commonly after arachnoid hæmorrhage, and, in such cases, there may be some signs of this event at the period of attack; but its phenomena in the child are so variable, that the diagnosis cannot be established with any certainty.

§ VIII. URINÆMIA.

When the nervous symptoms of urinæmia are pain in the head, amaurosis, delirium, or confusion of thought, with convulsions, &c., they may resemble tumor, chronic softening, or meningitis. The pain, however, is rarely acute; there is drowsiness, or a peculiar coma and stertor (see p. 109), and the extrinsic symptoms furnish the means by which a diagnosis may be established.

PART III.—DISEASES OF THE SPINAL CORD.

CHAPTER XV.

THE DIAGNOSIS OF SPECIAL LOCALITY AFFECTED.

THE general grounds for distinguishing diseases of the spinal cord from those of the cerebrum and nerves are stated in Chap. IV. We have, however, in the case of spinal disease, to carry the local differentiation further, in respect of—

I. The region affected (cervical, dorsal, lumbar, &c.).

1. The lumbar and dorsal regions. The lower limbs are alone implicated when the lumbar or lower dorsal regions are diseased, and the most frequent functional disturbance is loss of motility. Sensibility is (in all localities of lesion) much less frequently, and less severely changed; and its alterations take place at a later period. The bladder and rectum are paralysed; but erection of the penis is not common; and it is especially rare in affections of the lumbar portion. Respiration is not changed; the limbs (lower) are cold; with harsh and dry skin, or œdematous ankles; and bed-sores are very readily induced by pressure.

When the upper dorsal region is the seat of disease or injury, respiration is impeded by loss of motility in some intercostal and in the abdominal muscles; but unless the lesion extends above the second dorsal vertebra, the upper limbs retain their functions.

2. Cervical region. Affections of the cord opposite the first dorsal, or the last two cervical vertebræ, implicate the

movements of the arms. If disease extends no higher than the sixth cervical, the arms retain their movements at the shoulders; but the fingers, hands, and fore-arms are paralysed. The abdominal and intercostal muscles have their motility impaired; and thus respiration becomes difficult and suspirious, being mainly performed by the diaphragm and external muscles. Expiration is more laborious than inspiration, and sometimes the former is considerably impeded. If disease or injury affects the cord above the sixth or fifth cervical vertebra, and the phrenic nerve is implicated, the dyspnœa is most urgent. The patient appears compelled to attend to his breathing; it is performed almost exclusively by voluntary effort; the shoulders are alternately elevated and depressed; and the unfortunate sufferer feels as if life or death depended upon his own exertions.

If the lesion exists higher than the fourth or third vertebra, death is extremely rapid, owing to asphyxia from paralysis of the respiratory muscles.

Under all circumstances of cervical disease, priapism is common; the intestines become distended with flatus; dysphagia is frequent; articulation is rendered indistinct, and often impossible; there is paralysis of the rectum and bladder, with retention of their contents; and this is followed in many instances by involuntary evacuation. It is very common to find that, when the spinal meninges are diseased, there is a somewhat analogous condition of those in the encephalon; and thus sensorial excitement and mental changes accompany those which are dependent upon the spinal affection.

The locality of disease may be discovered by the existence of spontaneous pain, or tenderness, at a particular point of the vertebral column; and the latter may be estimated by pressure, concussion of the spinous processes, or the application of heat (by means of a sponge, or cloth wrung out of hot water). It happens not unfrequently that this last test indicates the existence of tenderness, which was not felt upon pressure, or percussion. Disease of the bones, or their displacement, may likewise afford most important aid in many cases; but it must be remembered that the central affection may extend beyond the limits of disease in the bones.

II. The columns affected (anterior, posterior, lateral).

In many cases the symptoms are referred solely, or principally, to one function of the cord; but post-mortem examination reveals equal lesion of the anterior and posterior columns. Clinical observation has done little more than exhibit the palpable contradiction by fact, of ingenious theories and experimental inferences. It may, however, be gathered from recorded cases, that where motility is at the first exclusively affected, the anterior and antero-lateral columns are most probably diseased: and *vice versâ*, that, when sensibility is primarily deranged, the probability is that the posterior, or postero-lateral columns are principally affected.

There is great difficulty in establishing with accuracy the primary seat, or amount of lesion; owing to the probability of injury during removal of the cord, the existence of post-mortem changes, and the fact that disease very commonly involves all the columns of the medulla before it comes under the eye of the anatomist.

III. Histological elements (grey and white matter).

Physiological experiment has not directly demonstrated its truth, although comparative anatomy furnishes strong evidence in favour of the view, that the white tissue is the especial medium of conduction, and the grey matter the (material) instrument of the central functions of the cord. In post mortem examination, and in the observation of patients during life, there has not been sufficient attention directed to the inquiry, whether clinical facts and morbid anatomy can elucidate each other upon this point, and confirm, or refute the physiological doctrines with regard to these two structural elements.

In this treatise it has appeared to me desirable to indicate the possibility of such a distinction, and the points upon which its formation would depend. They are, in all probability, the relations of motility and sensibility to volition and perception on the one hand ; and to external impressions, apart from mental changes, on the other. In other words, the modifications of centric and conductive functions; which are more fully described in the next chapter.

CHAPTER XVI.

THE DIAGNOSIS OF SPINAL DISEASES, AS TO THEIR GENERAL NATURE.

THE physiological functions of the cord being readily divided into two groups, we may make use of this division clinically, by recognising morbid changes in the conducting and centric properties. By the former, the cord is allied to the nervous trunks; inasmuch as it transmits sensory impressions to the cerebrum, and volitional impulses to the muscles: by the latter, it (the cord) is related to the cerebral organs; inasmuch as it is the source and origin of the stimulus of muscular contraction, and contains within itself the means of converting external impressions into motor impulses.

I. Modifications of conduction. There is nothing to show that this function undergoes any increase of activity; but we may readily recognise its diminution and perversion.

A. Diminished conduction.

1. In respect of sensation. This is subjectively revealed as hypæsthesia or anæsthesia (*i. e.*, diminution or absence of perception of external impressions). The special cranial senses are not affected, and such changes as do exist are referrible to the extremities, most frequently the lower. Susceptibility of impression (as exhibited by asensual reflective movements) persists; and although bladder and rectum may become distended, from the patient being unconscious of their condition, the power for their evacuation remains, and there is no involuntary discharge of their contents. The diminution of sensation may

affect the muscles or the cutaneous surface; in the former case, inducing anæsthesia muscularis (see p. 165), in the latter, diminution of tact; estimated roughly by observation of pinching, pricking, &c., but more accurately by Weber's method with the compasses. This diminution of apparent conduction is generally the earliest sign of those chronic spinal diseases which end in paraplegia.

2. Diminished conduction of motility. This is phenomenally represented as paralysis to volition, ideation, and emotion; and the paralysis may exist in any degree (see p. 32, *et seq.*). The essential features of such a morbid condition are, the separation of motility from the three above-mentioned sources of motor impulse, and the persistence of tonic (centric), diastaltic (reflex), galvanic, and proper (vis insita) motility.

B. Perverted conduction is extremely common.

1. In respect of sensation. By this term we may include those abnormal sensations which are referred to the trunk or the limbs (in connexion with disease of the spinal cord); such as numbness, formication, pain, sensations of heat, cold, &c. In some cases, these feelings may depend upon a morbid centric condition; and may be mentally referred to the periphery in the same manner as irritation of the end of a nerve, divided in amputation, is referred to the extremity of the limb, which has been removed. In other cases, they may be the result of a modifying influence exerted, by the medullary disease, upon afferent impressions; the latter sometimes being originated by extraneous influences, such as the contact of clothes, &c.; sometimes having their origin in those organic processes, which in health produce their due effect insensibly; but which, in this morbid state, become sensible, and result in referred sensations. Or again, it is well known that spinal disease exerts a marked influence upon the organic (nutritive) processes, and it may be that these sensations are not so purely central as the foregoing suppositions would make them, but that they are indications of morbid processes actually present in the periphery. (See p. 205.)

Whatever may be their precise mode of origin, these perverted sensations are of considerable value in connexion with the diagnosis of spinal diseases, as they commonly indicate the presence of some morbid action, and require treatment very different from that which hypæsthesia demands.

2. In respect of motility. This perversion of conduction is common in epilepsy and allied affections, and also in many organic diseases of the cord. Voluntary movements are executed clumsily, and very frequently the patient does precisely the reverse of that which he intended. (See Volition and Motility, pp. 19, 32, *et seq.*)

II. Modifications of centric functions. It is at once obvious that we cannot assert the existence of any purely spontaneous centric properties; since nutritive changes are incessantly progressing in the cord itself, and there are unnumbered impressions from without (*i. e.*, from the organic processes of the body), which may be unconsciously received, but which no less surely become the stimuli of spinal action. Some centric functions are, however, observed in dependence upon external impression, and others are not; and this is an important distinction, inasmuch as it enables us to separate the modifications of tonic (or centric) motility, from those of reflexion (see p. 36 and 40), and we have to consider further, the relation of centric functions to sensibility, and to the organic processes.

A. Increase or exaggeration of centric functions.

1. In relation to sensation. In health the organic processes are unfelt; in disease they are often attended by sensation; and thus, with regard to those processes which depend upon the spinal cord, they become intensely painful in disease, although we are unconscious of their presence when in a normal condition. Thus, movement is almost unbearable in meningitis of the cord, and there is persistent pain in the spinal region, as an accompaniment of its spasm. Spontaneous pain in the vertebral column may arise in the same manner as it arises in any other organ when diseased (*i. e.*, from the simple augmentation of its sensibility in dependence upon vascular or other conditions), but this does not account for all the suffering; some part of it appears, as stated above, to be due to

the functional exercise of the organ. The relation of pain to centric properties is thus distinguished (from that in relation to conduction) by its reference to the vertebral region—*i. e.*, to the cord itself.

2. Increase of motility. This is presented in two generic forms,—tonic, and clonic spasm. If we consider the former as essentially reflex—*i. e.*, as being invariably induced by some impressions from without—the two forms differ only in degree, or in some minor quality; and we have then to study separately the two elements of a reflex action, viz., susceptibility of impression, and motor impulse; the exaggeration of the former, inducing increased readiness of action, that of the latter, its exalted force or persistence. If, however, we consider the tonic contractions, dependent upon the cord, as purely centric in their origin (and their persistence after division of the posterior roots of the nerves is scarcely compatible with any other belief), we have to separate their morbid relationships from those of reflexion, by placing the two in distinct categories; and this is the plan which is adopted in the present work.

a. Increase of tonic contraction, regarded as dependent upon centric stimulus, and presented as continuous spasm, for example, in meningitis, tetanus, &c. (See p. 40, and Chapter XVII.)

b. Increase of clonic contractions, occurring as convulsive movements of the whole body, or as spasmodic phenomena in certain parts; and observed clinically in hysteria, epilepsy, hydrophobia, &c. (See p. 36, &c.)

B. Diminution of centric functions.

Although the susceptibility of the cord to impressions might be denominated its sensibility, yet it is preferred to consider the changes of this property among those of its reflective (motor) function, by which alone they are phenomenally presented for observation.

1. Diminution of motility, in its two forms.

a. Deficient tonic contraction, recognised by flaccidity of the muscles, and their want of contractility under electric stimulation; and presented clinically by their general tonelessness, the relaxation of the sphincters, the dilated pupil, and paralytic stertor.

b. Deficient clonic contractility, or diminished reflexion; occurring phenomenally in the form of immobile pupil, impeded, or rather imperfect respiration, and the absence of any clonic contractions in the limbs upon irritating their cutaneous surface.

It is often by the absence of these signs that we are able to diagnosticate the locality and extent of spinal disease; they are presented in various combinations, some of which will appear in the succeeding chapters.

2. Diminution of organic functions, or their perversion. This very generally follows the changes of centric motility; but the many variations which occur have yet to be reduced to order, in order to possess any diagnostic value. They may be enumerated thus:—

a. Changes of temperature and colour.
b. Interference with nutrition.
  i. Wasting of muscles, their degeneration, &c.
  ii. Gangrene or sloughing of integuments.
c. Alterations of secretion.
  i. Œdema of extremities.
  ii. Changes in the urine, quantity and quality.
  iii. Perspiratory alterations, quantity and quality.

The distinctions already described, although very important, do not furnish the means of classification for clinical purposes. This arises from the frequency with which affections of the cord, though at first involving only one group of functions, rapidly extend to the other. Thus hæmorrhage and myelitis, which commonly at their commencement impede conduction only, may very rapidly impair the centric functions; and meningitis, the earliest symptoms of which are modifications of centric properties, at a later stage is marked by derangement or deficiency of the function of transmission. We may judge of the severity of injury or disease by its implication of the proper centric functions; and the manner and proportion in which one or the other group of properties is involved, is often of essential service in the diagnosis.

For clinical purposes, the spinal diseases may be divided into acute and chronic, and we proceed at once to the differentiation of the former.

CHAPTER XVII.

ACUTE DISEASES OF THE SPINAL CORD AND ITS MENINGES.

THIS chapter includes some diseases having a distinct anatomical (or structural) change as the cause of their symptoms, and others to which no discoverable static condition can be thus related. Some are inflammatory, and others are not; but it accords best with the object of this book to disregard these distinctions, and to frame one large group (the several members of which present many elements in common), and, by thus collocating them, to render their differential diagnosis more perspicuous.

Those to which attention is directed are the following:—

I. Plethora spinalis, or congestion.
II. Meningitis.
III. Myelitis (acute softening).
IV. Meningo-myelitis.
V. Tetanus (idiopathic).
VI. Hydrophobia.
VII. Hæmorrhage, meningeal and spinal.
    1. Into the spinal column.
    2. Into the tuber annulare.
VIII. Concussion of the cord.

The first presents generally depressed conducting power; the second to the sixth, inclusive, occur with every variety of combination, both of excess and defect; the seventh and eighth present diminished function, and especially that of conduction. When the diseases are protracted, they are marked sometimes into "stages," characterised by symptoms, differing in their general relation to functional activity.

§ I. PLETHORA SPINALIS.

The phenomena of this condition are somewhat obscure. Dr. Abercrombie was the first, in this country, to call attention to their consideration, and to indicate their relation to vascular changes in the cord.

1. Precursory conditions are generally those of ill-health, such as are found after prolonged and exhausting diseases. The suppression of habitual discharges, either naturally or artificially, such as the cessation of the catamenia, the lochia, or of hæmorrhoidal flux, are commonly placed among the predisposing circumstances which are of some diagnostic value.

2. Developed symptoms may occur suddenly or gradually.

a. Sensorial. There is pain in the lumbar or sacral region; it is somewhat increased by movement; but is never very severe, and may be absent altogether. It commonly travels from below, upwards. The limbs feel heavy, and present numbness, formication, &c.; but very rarely anæsthesia.

b. Motorial symptoms are not highly marked.

i. Conductive. There is slight (*i.e.*, imperfect) paralysis to volition, occurring most commonly in the lower extremities, but being sometimes limited to the upper, and sometimes general. The bladder and rectum are usually unaffected.

ii. Centric. There is neither tonic nor clonic spasm; and paralysis rarely exists in relation to the centric functions. Respiratory movements are slightly retarded; but the pulse exhibits no change.

c. Mental functions are unchanged.

3. Disappearance of symptoms may be sudden; but this is not common: generally they last two or three weeks. There is not the progressive intensification of symptoms observed in meningitis, myelitis, or hæmorrhage; and when their development has been somewhat sudden, there is slight amelioration in the course of a few hours or days.

The persistence of symptoms for a long period renders it probable that something more than simple hyperæmia is their cause; but we are quite ignorant of its precise nature.

§ II. MENINGITIS.

Spinal meningitis is frequently associated with cerebellar disease, or with inflammation of the intra-cranial membranes, and in such circumstances the symptoms are complicated with intellectual and sensorial phenomena, not essential features of the spinal affection. It is desirable to lose sight of these for a time, and consider only those morbid changes which result from the spinal disease.

1. Precursory conditions. The most common are,—the existence of a rheumatic tendency, the suppression of habitual discharges, diseases of the bones, blows upon the back, or falls upon the nates or feet, and violent exertion. Prodromata are sometimes altogether wanting; but at other times there may be deep-seated, dull pain in the back, with slight motorial and sensorial changes, such as aching in the limbs, and general uneasiness or malaise, and lassitude.

2. Developed symptoms are intrinsic and extrinsic.

a. Intrinsic, in spinal meningitis, *per se*, are motorial and sensorial only.

i. Sensorial changes are of two kinds (centric and eccentric, or conductive).

α. Centric. Pain referred to the spine, at first slight, but rapidly increasing in severity, and becoming almost intolerably violent. It usually occupies the lumbar or dorsal regions, and corresponds in locality with the maximum of inflammatory action. It undergoes remissions, sometimes periodical, sometimes not; it is greatly increased by movement of the body, or by the application of a heated sponge; but it is not augmented by pressure of the spinous processes.

β. Conductive (phenomenally eccentric). Pain is felt in the limbs, and around the thorax and abdomen; accompanied often by a sense of constriction. There are modified sensations in the limbs, such as pricking, numbness, &c., and every impression is painful (dysæsthesia); and these conditions generally persist, the occurrence of hypæsthesia or anæsthesia affording evidence of myelitis.

ii. Motorial symptoms, principally centric.

a. Centric. The most characteristic phenomenon of spinal meningitis is tonic spasm; commencing, and persisting with maximum intensity, in the muscles of the neck and back; but occasionally presented by almost all the muscles of the trunk and limbs. The degree (or force of contraction) varies from comparatively slight stiff-neck to complete opisthotonos. The jaw and the extremities participate occasionally; but not very frequently. The spasm is much increased by any attempts at movement: respiration is painful and laborious. There is little or no clonic spasm, and this tetanic state appears to be due to an induced condition of increased centric power.

β. Conductive. Paralysis to volition occurs sometimes; but rarely, except after several days have elapsed, and when there is reason to believe that myelitis exists in combination with the meningeal inflammation. Feebleness of the limbs is common. The fæces and urine are retained (? by tonic contraction of the sphincters), and this retention may be the only symptom that occurs for some days; or they are, at the first, or subsequently, passed involuntarily (? by compression from tonic spasm, or by paralysis of the spincters). These variations are probably due to the condition of the cord itself.

iii. Mental symptoms are absent when meningitis is limited to the cord : but towards the close of life there is coma; and there may be some delirium of mild character at an earlier period, due in all probability to the febrile state, and differing essentially from the fierce delirium which is presented by complication with cerebral meningitis.

b. Extrinsic symptoms at the onset are those of highly marked fever; the heart's impulse is forcible, but the radial pulse is commonly small and feeble. There is insomnia, and frequently considerable diaphoresis. Towards the close of life the mouth becomes dry, sordes appear, and the patient's condition is that of prostration.

The duration of meningitis is variable; death may occur from the fourth to the fourteenth day, or the affection may become chronic.

Cerebro-spinal Meningitis may be diagnosticated by its presenting the features of its two elements in combination. It occurs sometimes sporadically, sometimes epidemically; and in the latter form is especially prone to occur in the male sex, and in those of the military profession who have been exposed to excessive fatigue, or to the violence of weather. It has, however, been observed in children of from seven to twelve years of age; but, under all circumstances, the diagnosis is comparatively easy, and requires no further comment.

§ III. MYELITIS.

Although the course of this disease is frequently rapid, and there can be little or no doubt of its inflammatory character, it is (like encephalitis) unattended by the ordinary organic signs of an acute inflammation; and its symptoms, though acute in respect of time, are often developed in the manner of chronic disease—*i. e.*, gradually and progressively.

1. Precursory symptoms, ætiologically considered, possess little distinctive character. The rheumatic state, which has been held to be predisponent, may in reality have been nothing more than the early symptoms of myelitis, erroneously attributed to this blood condition. Contusions of the back, diseases of the bones, excesses of various kinds, suppressed discharges, &c. &c., may give rise to plethora spinalis, or meningitis, with equal frequency.

2. Developed symptoms are in the main intrinsic, and are referrible to changes of motility and sensibility.

a. Sensorial (centric and eccentric).

i. Conductive (phenomenally eccentric). The earliest changes are recognised in the extremities, the fingers and toes. There is a feeling of cold and numbness, or of pricking and pain; and this gradually extends to the upper part of the limbs. There is, not uncommonly, a sensation of constriction in the throat, thorax, abdomen, or lumbar regions, according to the locality of inflammation; and the feeling is as if a cord were tied round the part. These modifications (metæsthesiæ) are succeeded by hypæsthesiæ and anæsthesiæ; but the losses of sensibility are much less marked than those of motility.

ii. Centric. There is some pain in the region of the cord itself; but it is much less than in meningitis. It is most common in the lumbar region, because myelitis most frequently affects that portion. The pain is not materially increased by movement; but it is augmented by forcible pressure of the spinous processes, and by the application of heat. It is frequently so slight as to be taken for simple lumbago, or rheumatism.

iii. The cranial senses are sometimes implicated, and cephalalgia occurs; but such phenomena do not belong to myelitis, *per se.*

b. Motorial. (Both conductive and centric phenomena).

i. Conductive. Like those of sensibility, the earliest and most characteristic derangements of motility are observed in the periphery. They are those of defective function, viz., difficulty of directing movement, and diminution of motor power in relation to the will. The muscles affected vary with the locality of inflammation; when myelitis is cervical there is dysphagia, impeded articulation, and laboured respiration; when it is lumbar, the lower limbs are affected. (See p. 198.) Under any circumstances of localisation, paralysis commonly affects one side earlier and more profoundly than the other; and it exhibits a tendency to extend, until whole limbs, or the greater part of the body, become incapable of movement. Retention of urine and fæces is a common phenomenon at the commencement.

ii. Centric. The tonic contraction of muscles is little, or not at all, affected, unless meningitis coexists, or until the disease has existed for some time: in the former case there is tetanic spasm; in the latter, absence of tone, evidenced by involuntary micturition and defecation. Reflex phenomena, on the other hand, are extremely common. They occur in the limbs in the form of clonic spasms; and, in children especially, general convulsions are not unfrequent. When the middle dorsal region is the seat of inflammation, there are peculiar convulsive movements of the trunk, neither the upper nor lower extremities being implicated. There is, not uncommonly, the involuntary (or spasmodic) evacuation of bladder and rectum during the convulsive paroxysms.

c. Mental. In typical cases, not involving the upper portion (cranial) of the cord, the mind is unaffected; but in many instances coma occurs for some hours or days before death. It is generally a moribund phenomenon, and is preceded by convulsive paroxysms. The absence of intellectual change is an important distinction from general paralysis complicating insanity.

Extrinsic symptoms are not sufficiently marked to require any further notice than this, that their absence is often an important means of distinction from meningitis. The affection is commonly hyper-acute, and terminates in a few days; but, if this is not the case, sloughing of the integuments occurs, and hastens the prostration of the patient to a final issue.

The duration of myelitis is less when located in the dorsal region than when in any other; and this has been explained by the smaller size of the cord in that portion of the column. M. Ollivier* has drawn attention to the frequency with which myelitis coexists with entero-gastritis and pneumonia; but we cannot, in the present state of medical science, determine whether these inflammations are the result of spinal disease, or whether, by the profound alterations of nutrition which they induce, they are the causes of myelitis. The relation probably differs in different cases; but it is important that such organic changes should be sought for, and should receive due consideration in the interpretation of phenomena.

§ IV. MENINGO-MYELITIS.

This disease is more common than either of its elements in an isolated form; and its diagnosis (as in the case of cerebro-spinal meningitis) consists essentially in the recognition of the two classes of symptoms in combination. Spinal pain and tonic spasm indicate the existence of meningitis; peripheral pain, or anæsthesia, and paralysis denoting implication of the cord itself.

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* Traité de la Moelle Épinière, &c., p. 640.

In children this is by far the most common form in respect of symptoms; but in them the existence of tetanic rigidity is not always accompanied by post-mortem evidences of meningitis.

§ V. TETANUS.

It is only to the idiopathic (*i.e.*, non-traumatic) form of this disease that attention is directed. Its symptoms are so characteristic that there is little probability of its being confounded with other affections. There are no anatomical changes to which they can be referred; and hence we must, for the present at all events, consider them as dynamic in their origin. Little can be gained from an examination into the precursory condition of the individual; inasmuch as all those which have been described as causative stand in the same relation to meningitis, plethora, myelitis, &c.

Prodromata are commonly absent, or, if present, they possess no distinctive character.

Developed symptoms are essentially motorial. The first phenomenon of any diagnostic value is tonic spasm; and this persists throughout, forming the special pathognomonic sign of tetanus. It usually commences in the muscles of the jaws and of the neck; and gradually extends to the trunk and limbs, placing the whole body (or its parts) into most frightful postures. Deglutition and respiration are impeded by spasmodic action; there is obstinate constipation of the bowels, with retention or involuntary emission of urine. Every emotional excitement, or sensorial impression, increases the spasm, or may induce violent convulsive movements of clonic character.

The mind is unaffected, and the patient often sleeps quietly at night; there is no febrile reaction; and the voice is commonly unaffected. These general characters are sufficient to differentiate tetanus from every other disease. Meningitis (which it resembles in presenting tonic spasm) is distinguished by the locality of contraction, the spinal pain, and the febrile condition. Epilepsy and eclampsy are at once recognised by their special forms of convulsion, and their paroxysmal occurrence. Hysteria is known by the antecedent symptoms, by the clonic character of its spasms, and by the co-existence of hysterical phenomena.

§ VI. HYDROPHOBIA.

The symptoms of hydrophobia occur sometimes independently of any bite from a rabid animal. They are, under such circumstances, less intense, and far less fatal than the genuine disease; resembling the exaggerated and erroneous ideas with regard to hydrophobia, rather than that affection itself.

The commencement is sometimes sudden, immediately following "fright," violent emotion, or some organic shock. At other times there is a greatly prolonged period of incubation. The first characteristic symptom is horror of liquids (and this may be the only symptom, as is sometimes exhibited by pregnant women). There is then, constriction of the throat, followed by salivation, attempts to bite, and general convulsions. Emotional excitement, or sensorial impressions, induce clonic spasmodic phenomena of various kinds.

The diagnosis of hydrophobia is attended by no difficulty; but it is sometimes far from easy to distinguish between the real and the spurious affection. The latter may be inferred, if symptoms have occurred immediately after an accident, such as the bite of an enraged animal, and especially if the animal has not been demonstrably rabid; or if they have occurred after a very long interval; or if they have arisen spontaneously. The persistence of symptoms for a longer period than four or five days is conclusive evidence that the hydrophobia is not that of rabies; since the latter is almost invariably fatal within that time.

§ VII. HÆMORRHAGE.

Spinal hæmorrhage may take place into the meningeal cavity, or into the substance of the cord itself; the former occurs most frequently in conjunction with cerebral hæmorrhage, and the latter is most common in the tuber-annulare.

It is often quite impossible to determine the seat of hæmorrhage, during life; but, after pointing out the means by which spinal apoplexy may be diagnosticated generally, some hints will be given by which its further localisation may be attempted.

1. Precursory symptoms. These may be entirely wanting; and when present they do not afford any very satisfactory indication. The most frequent are,—pain in the back and limbs (often taken for rheumatism); the sensation of painful constriction around the trunk; general lassitude; shivering; and fatigue from awkward positions, from bearing weights upon the shoulders, or from any over-exertion.

2. Symptoms of the attack are induced suddenly in the greater number of cases; but in some slowly and progressively.

a. Sensorial. There is acute pain in the spinal region, corresponding with the seat of hæmorrhage. The conduction of sensorial impressions is slightly interfered with, but hypæsthesia of the parts situated below the locality of lesion is an unfrequent, and very imperfectly developed phenomenon. Painful sensations in the limbs sometimes precede the occurrence of paralysis.

b. Motorial. There is paralysis (to volition) of bilateral distribution; it is not often complete, and may be more marked on one side than the other. Sometimes, but rarely, the bladder and rectum are implicated, involuntary evacuations taking place. The parts which are paralysed vary with the seat of hæmorrhage (see p. 198); the lower extremities may be alone affected; or the loss of motility may be general; and dyspnœa urgent.

c. Mental. The mind is generally unaffected; but there may be slight incoherence, or vertigo.

3. Sequelæ of the attack. The disease is commonly fatal in a few days; but in rare cases, the patients recover from the immediate symptoms of the attack (pain and marked paralysis), retaining some loss of motility for a lengthened period.

Nutrition is affected early; the limbs waste, and sloughing sores occur on the parts exposed to pressure.

Meningeal hæmorrhage, is commonly accompanied by clonic spasms, or by tonic contraction of the muscles paralysed to volition.

Hæmorrhage into tuber-annulare. The symptoms resemble those of cerebral hæmorrhage; there is loss of perception, and volition; and with this—paralysis, of general extent, hemiplegic, or confined to the arms; extreme dyspnœa, with tracheal rattle; convulsive movements of the limbs, or of the whole body, and, in their interval, tonic spasms. Death sometimes occurs instantaneously, and in the immense majority of cases within a very short period.

§ VIII. CONCUSSION.

The most important means for distinguishing the simply dynamic effects of concussion from those of organic lesion, are the following.

They occur as the immediate result of violence, most commonly of physical nature (such as a fall, a violent blow, &c.); but they may follow intense mental or emotional shock.

All the functions of the cord are simultaneously involved. There is loss of centric and conductive properties.

There is neither marked pain, nor spasm.

The symptoms disappear in a comparatively short time.

When they persist, there is reason to believe that some ulterior organic changes have taken place, and this is to be distinguished upon the principles already laid down.

CHAPTER XVIII.

CHRONIC DISEASES OF THE SPINAL CORD.

THESE, although very numerous and various in their individual characters, may be readily formed into large groups, the diagnosis of which is comparatively easy. The features presented by chronic myelitis (for example), in different cases, are widely different as to detail, but they have a strong generic similitude; and, although it would occupy much time and space to draw anything like a picture of the clinical history of such cases, it will not take much of either to point out the general characters by which (under various forms of development) the disease itself may be recognised. Many of the variations which occur are due solely to the locality of cord affected, and into these variations it is not my purpose to enter now; such general remarks as bear upon the diagnosis of locality having been already made, in Chap. XV., p. 198.

The diseases which are presented for differentiation, are:—

I. Chronic myelitis (or softening.)
II. Chronic meningitis.
III. Induration and hypertrophy.
IV. Tumors,
    1. Diathetic, *e. g.*, tubercle, carcinoma.
    2. Non-diathetic, *e. g.*, hydatids.
V. Idiopathic paraplegia (dynamic.)

§ I. CHRONIC MYELITIS.

This is less frequently idiopathic than the acute disease; its most common causes are,—caries or fractures of the vertebræ, and tumors; but it occasionally remains as the sequela of acute inflammation.

1. Precursory symptoms are sometimes intrinsic only, sometimes extrinsic. Among the former, the most characteristic is fixed pain, of very limited extent, in the spinal region: and in

conjunction with this, there is a peculiar restlessness of the limbs (commonly of the lower); and a sensation of heat in the skin, or some other modification of sensibility. The most common extrinsic symptom is prominence of one or more spinous processes.

2. Developed symptoms are of two classes.

a. Intrinsic, affecting both motility and sensibility.

i. Sensorial. Pain, assuming a variable course, sometimes persistent, sometimes remittent. Metæsthesiæ in the lower limbs, or in those parts which are supplied by nerves arising from the inflamed portion. Hypæsthesiæ in the parts supplied by nerves having their origin below the seat of lesion. Marked anæsthesia muscularis (see pp. 35 and 165); but very rarely complete cutaneous anæsthesia, until a later period. Ollivier* accounts for the general freedom of sensation from marked change, by the locality of disease (caries of the bodies of the vertebræ) being such as to implicate the anterior rather than the posterior columns of the cord.

ii. Motorial. These are changes in the conductive and centric functions, and usually those of the former precede, and are more marked than the latter.

α. Conductive. The earliest change is diminution in the power of directing movement (phenomenally a derangement of motility; in reality, most probably, dependent upon anæsthesia muscularis). Distinct decrease of motor power follows; it generally assumes a bilateral distribution; and, when paraplegic (in the legs for *e. g.*), the patient commonly moves more readily after exercise, the difficulty of movement being greater after rest. Retention of urine is a frequent symptom. The paralysis progresses in intensity.

β. Centric. At the commencement, there are commonly no morbid phenomena. As the case proceeds, and the conductive functions are more completely arrested, there is very commonly some excess of centric irritability; reflex movements are induced more readily than in health; and coughing produces spasm of the paralysed (to volition) limbs. Slight rigidity and clonic contractions occur sometimes; but the most frequent condition of the limbs is that of flexion and adduction. The patient has much difficulty in their extension. Various modifications of respiration occur in dependence upon the locality of lesion. (See p. 198.) But unless the disease has advanced so far as to destroy (functionally) some portion of the cord, the tonicity of the muscles remains, and they retain their irritability to galvanic stimulation.

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* Op. cit., p. 408.

b. Extrinsic. These at the first are local, viz., the signs of diseased bone (prominence of spinous processes, and other deformity): at a later period, there are nutrition changes in the limbs, indicated by wasted muscles, cold integuments, unhealthy skin, &c.; and some general disturbances, such as hectic, and general emaciation.

§ II. CHRONIC MENINGITIS.

This disease rarely exists except in connexion with caries of the bones, or some other affection external to the meninges.

a. Intrinsic symptoms are of two kinds.

i. Sensorial. Severe, often paroxysmal pain, in the spinal region; and painful sensations in the limbs, with considerable feeling of fatigue, and cramp. Anæsthesia is very uncommon.

ii. Motorial. The centric functions are affected before, and to a greater degree than the conductive.

α. Conductive. There is deficient voluntary power, which exhibits a tendency to extend upwards; but which is sometimes very curiously limited to particular groups of muscles. When the disease progresses to the cranium, the muscles of the face, eye-lids, and eye-balls become involved; producing ptosis, or strabismus, with diplopia, &c.

β. Centric. There is stiffness of the muscles in the limbs; marked tonic spasm of those in the neck and back; with clonic spasms occasionally, and sometimes general convulsions.

b. Extrinsic symptoms are like those of myelitis. The skin of the extremities becomes peculiarly dry and desquamative (Ollivier); and the lower limbs very frequently œdematous.

Cerebral complications are frequent; there is slight delirium at night; or there may be irritability of temper, and various disturbances of the special senses; that of sight being the most common, and adding much to the difficulty of progression, by diminishing one most important means for the direction of voluntary movement.

CHRONIC MENINGO-MYELITIS is more common than either of the two elements of disease in an isolated form. Its symptoms are those of inflammation in the two structures, presented in combination—viz., chronic paralyses, and tonic spasm, with local (spinal) and referred pain.

§ III. INDURATION AND HYPERTROPHY.

These conditions cannot be diagnosticated with any certainty. They may be inferred to exist from the absence of any signs of disease in the bones, or of tumors pressing upon the cord; and the presence of various motor and sensory changes, such as metæsthesiæ, and spasms, followed by hypæsthesiæ and paralyses; together with extrinsic phenomena of malnutrition. The loss of function gradually extends, and the muscles generally become atrophied, until the whole body is involved, or rendered useless.

§ IV. TUMORS, ETC.

Tumors of the spinal column, implicating the functions or structure of the cord, are of very various kinds; but they may be divided into two large groups, by the presence or absence of certain dyscratic conditions. We cannot positively assert the systemic, or local origin of tumors; but some are attended by general changes, and others are not; and although this distinction may mislead in certain cases, it is of considerable value, inasmuch as the diagnosis of such diseases can rarely be advanced beyond the point to which it (the distinction between diathetic and non-diathetic) may lead.

a. Intrinsic symptoms, like those of encephalic tumor, are of variable character, presenting this in common with the latter, that they consist of different alterations in the functions of the parts involved, some being in a state of exalted, and others of depressed activity.

i. Sensorial. Pain in the spinal region, and modifications of transmitted sensorial impressions (conduction), such as numbness, pricking, formication, &c., in the limbs; followed by hypæsthesia and anæsthesia. Pain is more marked in cases of carcinoma than of tubercle.

ii. Motorial. Paralyses, and convulsive attacks often alternate, and the latter not unfrequently assume an epileptoid character; the paralysis is slowly developed.

b. Extrinsic symptoms. These are the means by which tumors of diathetic origin may be separated from the non-diathetic. In carcinoma and in tubercle, there are, in addition to the evidences which may be afforded by the deposit or growth of their peculiar structural elements in the spinal region or in other localities, the signs of their peculiar dyscrasiæ; and these are sometimes very highly marked. The absence of such cachexiæ affords strong probability that the growth is of another nature. Aneurismal tumors may be diagnosticated by the special signs of such vascular diseases.

§ V. PARAPLEGIA (IDIOPATHIC).

Paralysis of the lower extremities appears sometimes to be simply dynamic, or functional—*i.e.*, independent of any organic or structural change which we are at present able to recognise. It may result from over-fatigue, induced by violent or prolonged exertion; from excesses of various kinds; but also from causes which are undiscoverable.

The symptoms commence insidiously, and progress slowly. Very frequently, anæsthesia muscularis (see pp. 35, and 165) is the first indication, and subsequently there is loss of power. Sensibility is little affected, as judged of by cutaneous impressibility. Sometimes there is slight contraction of the muscles of flexion and adduction, the foot being turned inwards and downwards; but this is probably rare in simple (dynamic) paraplegia. There may be aching in the loins, and fatigue upon the slightest exertion, with general anæmia, and organic depression, but there are no positive signs of structural disease.

PART IV.—DISEASES OF THE NERVES.

CHAPTER XIX.

GENERAL CONSIDERATIONS.

THE nerves are so numerous, and so varied in their functions, that much space would be occupied, and that probably to little profit, if the diseases to which they are severally liable were considered separately, and their individual diagnoses pointed out. It is not my intention to do this. The most important object of this book, with regard to nervous diseases, has been already accomplished in Chapter IV., page 57, where the means for distinguishing them from affections of the brain and spinal cord were entered upon at some length. The first object—viz., the diagnosis of locality, is attained thus far, without much difficulty, in the majority of cases; and the recognition of the particular nerve, or branch of nerve, which is the seat of disturbance, can be arrived at only by a knowledge of the anatomical distribution, and physiological functions of each division. With such knowledge, the locality of lesion may be (in many cases) determined with great precision.

In order to appreciate the nature of disturbance, it is necessary to know the ordinary healthy functions of the nerves, and then to discover the kind and amount of modification which is induced. The nervous trunks, forming part of the chain of communication between external impressions (or their organic effect) and the mind on the one hand, and between volition, emotion, sensation, or spinal action and muscular contraction on the other, exhibit, as phenomena of their diseases, modifications of these processes; the chain of communication may be impaired or broken altogether. Paralysis and anæsthesia result; in the former case the efferent (centrifugal), and in the latter the afferent (centripetal) conducting functions being interrupted. It is only at the extremes of a nervous trunk that its functions become phenomenal; and when the conducting properties are alone affected by disease, it is at the extremities only that symptoms are observed.

But not only are paralyses and anæsthesiæ peripheral in their distribution, but the exaggerated activity is frequently peripheral also; the symptoms not being pain in the portion of the nerve diseased, but pain at its terminal expansion in the skin, and spasm in the muscular fibres which it supplies. Thus it appears that the nerves, besides possessing a simply conductive function, have a peculiar property of transforming certain mechanical impressions, coming from without, or resulting from the presence of structural changes, but affecting them in their course (*i. e.*, not through their peripheral expansion or central origin), into the occasions of sensation on the one hand, or muscular contraction on the other.

If a muscular nerve is divided, and the portion in connexion with the muscle is irritated (by simple contact, pinching, galvanism, &c.), there is contraction of the muscle. If a sensory nerve is divided, and the portion in communication with the cranium is treated in a similar manner, pain is the result, and it is referred mentally to the peripheral expansion. These examples from physiological experiment, and others from surgical experience, are sufficient to indicate the peculiar property of the nerves alluded to—viz., their capability of inducing two classes of phenomena (motion and sensation) as the result, not of the ordinary physiological causes of those phenomena (volition and external impression), but of a pathological condition of the nerves themselves.

Besides these symptoms, which are referrible to the extremities of the nervous trunks, there are others which they exhibit in the intermediate portions; and when certain kinds of changes take place, there are extrinsic phenomena, of much importance in the diagnosis.

The following modifications of nervous functions may be readily recognised.

I. Excessive activity,

A. Of sensation; or sensibility. The most common and characteristic phenomenon is pain, or neuralgia. There is not, so far as I can discover, any real hyperæsthesia in dependence upon morbid conditions of the nervous cords. Hyperæsthesia is commonly connected with central changes (see p. 28). Dysæsthesiæ (see p. 30) are frequent accompaniments of the neuralgic condition; the latter appearing very often to hold no definite relation to the exercise of any normal sensorial process, must be considered as an epiphenomenon, or as occupying a relation to the proper (intrinsic) nervous functions similar to that which pain occupies to the morbid structural conditions of other organs.

B. Of motility. The phenomena being muscular spasm, which may assume a tonic, or clonic form.

II. Diminished activity, or complete loss of function.

A. Of sensation, or rather of impressibility. The symptoms thus produced are hypæsthesia and anæsthesia; and these symptoms may be present, whilst the nerve yet retains its power of conducting centripetal impressions which shall be the occasions of reflex action. But the latter power may also be lost, and then it appears that the "nervous" function is absent altogether.

B. Of motility. The paralysis which arises from lesion of the nervous cords, affects motility (not only in relation to volition, ideation, and emotion, but) as dependent upon the spinal cord (see p. 39, *et seq.*) It may be incomplete, or complete in degree; and when the latter, the muscles very speedily exhibit defective nutrition.

CHAPTER XX.

THE DIAGNOSIS OF SPECIAL DISEASES OF THE NERVES.

It appears to me most desirable to consider the whole of these affections in one chapter, as it is to the differentiation of certain groups, rather than to the separate diagnosis of diseases limited to individual nerves, that attention is directed.

Clinically we may divide these diseases thus,—

A. Organic, or structural.
  I. Neuritis (inflammation of the nerve trunks).
  II. Tumors; of two kinds,
    a. Painful sub-cutaneous tubercle.
    b. Neuroma (of various kinds).
B. Inorganic, or functional.
  III. Neuralgiæ, considering specially,—
    a. Facial. Neuralgia of the fifth nerve.
    b. Ischiatic. Sciatica.
    c. Dorso-intercostal.
  IV. Hypercineses, or spasms, considering specially,—
    a. Facial. Spasmodic tic.
    b. Oculo-motor. Strabismus.
    c. Laryngeal. Laryngismus stridulus.
  V. Anæsthesiæ, especially of the fifth nerve.
  VI. Acineses, or paralyses, and especially that of,—
    The facial nerve (portio dura of the seventh).

§ I. NEURITIS.

This disease is rare, but it occurs sometimes idiopathically, although more commonly as the result of contusions, lacerations, or disease of adjoining tissues. It is to be distinguished from neuralgia, arteritis, and phlebitis.

1. Precursory symptoms are unimportant. There are to be recognised, sometimes, as the occasional causes of this (as well as of every other) affection, exposure to cold and wet; the

suppression of habitual discharges; cachexiæ, &c.; but the most important indications may be gathered from the discovery of local injury, such as that to which the sciatic nerves are exposed during parturition, &c.

Extrinsic phenomena, for example, general malaise, or febrile excitement, may be present before any local symptoms occur.

2. Developed symptoms are of two kinds—intrinsic and extrinsic.

a. Intrinsic are both local and peripheral; the former being mainly sensorial, the latter motorial. There is extremely severe pain in the course of the nerve; it arises spontaneously, and is continuous, having its maximum of intensity at the point of greatest inflammation, and darting along the course of the nerve to other parts. There is marked tenderness on pressure; and this tenderness is not confined to particular points, but is coextensive with the spontaneous pain; and further, the tenderness is constant, and may be discovered by broad, as well as by concentrated pressure.

The peripheral phenomena are changes of sensation and motility. Numbness, formication, and pain occur in those parts which are supplied by sensory filaments; and paralysis, with or without clonic or tonic spasm, is present in the muscles. Paralysis is sometimes induced very rapidly, is complete, and persistent for a long time; its extent is very variable, but is in relation to the size of the nerve involved, and the number of muscles which it supplies; its intensity is in proportion to the severity of inflammation, to the nature of its secondary (organic) results, and to the rapidity of their production.

b. Extrinsic symptoms. When the nerve is superficial there are the ordinary signs of inflammation, redness and swelling. A reddened line may be traced along the skin, and the nervous cord may be felt beneath. There are not the nodosites observed in phlebitis; nor does œdema occur at the extremity. Changes of temperature, and of nutrition (gangrene, &c.), do not take place as in arteritis.

There is generally distinct febrile reaction (headache, heat of skin, accelerated pulse, anorexia, &c.), and it is sometimes very highly marked. This is one means of distinction from neuralgia.

§ II. TUMORS.

Tumors may be of very different kinds, but the intrinsic symptoms which they occasion present great similarity.

a. Intrinsic, are sensorial and motorial.

i. Sensorial. There is violent, paroxysmal pain in the tumor itself, and along the course of the nerves. The darting pain proceeds generally, but not invariably nor exclusively, in a centrifugal direction—*i. e.*, from the tumor towards the periphery. Paroxysms of pain are induced by pressure, by changes in the weather, by mental or emotional shock, and sometimes without any assignable (occasional) cause. Their duration is variable, from a few seconds to three or four hours. They are apt to occur during sleep; rousing the patient suddenly, as if startled by an electric shock. After the paroxysms, it is found that the skin is tender upon pressure.

ii. Motorial. Spasmodic and paralytic phenomena occur in the muscles of the periphery. General convulsions have followed in some cases, and have been cured by division of the nerve.*

b. Extrinsic symptoms are those caused by the tumor as a material object. The "painful tubercle" is of small size, and does not increase; its form is rounded or oval; there is commonly but one, and its most frequent locality is the lower extremity; it causes slight elevation of the skin; is more common in females than in males; † is generally found during early life; and if removed is rarely reproduced.

Scirrhoid and cystic tumors are of variable size, and often of rapid growth. They are commonly attended by general dyscrasiæ. Descot states that they exhibit no special tenderness when moved laterally, but that there is severe pain when they are moved longitudinally. ‡ They are not observed before puberty, and they are more common in men than in women.

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* Portal, Anat. Médicale, tome iv.

† Descot, Dissert. sur les Affect., loc. des Nerfs., p. 210.

‡ Op. cit., p. 248.

§ III. NEURALGIÆ.

Any sensory nerve may become the seat of neuralgia; but some are much more frequently affected than others. For example, the trigeminal (fifth) nerve of the face is peculiarly prone to suffer; and this is attributed to the constant exposure of its peripheral expansion to atmospheric changes, and to the frequency of direct irritation of some of its branches supplied to carious teeth.

Under all variations of locality, the principal features of neuralgiæ are the same; and therefore, after describing these (so far as they are of diagnostic value), only those special neuralgiæ will be alluded to, the symptoms of which present some similarity to those of other diseases.

a. Intrinsic symptoms. These exist alone in the great majority of cases, and in all they are notably predominant.

i. Sensorial. The characteristic symptom is pain. It is excessively intense in degree, and paroxysmal in its form. Its locality is that of a nerve trunk, and its peripheral distribution, darting from one to the other with almost intolerable violence; and generally, but not exclusively, observing a centrifugal direction. The development of pain is not so sudden as is generally stated. Valleix finds that, in six-sevenths of his cases, "it was developed gradually, but in a more or less rapid manner."* The earlier symptoms are dull pain, and the sensation of weight and heat.

There are two kinds of pain—one continuous, the other paroxysmal; the former is limited to particular portions of the nervous cords (generally their points of exit from osseous canals), the latter extends along the course of the nerves to their peripheric expansion. It is from those points in which continuous pain is present that the paroxysmal suffering radiates, and in them it reaches its maximum of intensity. Concentrated pressure, as with the tips of fingers, indicates that these points are tender; pressure increasing the pain in the locality itself, and causing darts of intolerable agony into the parts below. These points are sometimes numerous; but in their intervals there is no morbidly increased sensibility. Sometimes a particular spot, which at one moment was tender, ceases to be so for a time; the tenderness is greatest during the paroxysms, and is often altogether absent in the inter-paroxysmal period. Muscular movements increase the pain, and not unfrequently induce the paroxysms.

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* Guide du Medecin Praticien, tome iv., p. 306.

ii. Motorial. Spasmodic phenomena occur not uncommonly, and they may be tonic or clonic. After the attacks, paralysis of limited extent, and incomplete in degree, is sometimes seen; but these changes are generally of short duration.

b. Extrinsic symptoms. There is sometimes general indisposition, depression of spirits, sense of weakness, &c. Local phenomena occur but rarely, except during the paroxysms. They are changes in the vascular and organic conditions of the parts near to the seat of pain; such as eruptions on the skin, or erythema only; with increased secretion of glandular structures, such as lachrymation, coryza, &c.

A. Facial Neuralgia, known as "tic douloureux" and "prosopalgia," is one of the most common forms. Neuralgia may affect the whole nerve, one of its primary divisions, or only a single branch of one of the latter. The essential symptoms are those already pointed out, as characterising neuralgia generally.

1. General and precursory conditions. It is rare before twenty years of age; is more common in females than in males; commences earlier in life in the former; and is usually connected with uterine disturbances.*

2. Developed symptoms. These are rarely induced suddenly. The continuous pain and tenderness (described p. 228) are found at the points of exit of the cutaneous filaments; supra-orbital, sub-orbital, nasal, alveolar, mental, &c., and these afford the means of distinction from odontalgia.

Some contractions take place in the muscles of the face; the conjunctivæ are injected; the schneiderian membrane is dry and hot; there is tinnitus aurium, and often profuse lachrymation.

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* Valleix. Op. cit., p. 323.

B. Ischiatic Neuralgia, commonly termed sciatica, occurs more frequently in men than in women.

There are tender points near the tuberosity of the ischium, at the trochanter, the patella, and malleolus. Movement of the hip-joint, although painful, is not so severely painful as deep pressure; there is no general muscular tenderness (as in fibrous rheumatism), nor does contraction of the muscles (voluntarily, as in walking) cause such intense pain as in either rheumatism or disease of the hip-joint.

C. Dorso-intercostal Neuralgia is much more common in women than in men; and it most frequently affects one side only, generally the left.

The painful and tender points are,—vertebral, sternal, and lateral,—where the intercostal nerves supply cutaneous branches. Hysterical symptoms (see Chap. XIV., p. 170), are generally present; and there are no physical signs of disease in the respiratory organs or in the bones of the spinal column.

§ IV. HYPERCINESES.

Spasm, in dependence upon the nervous trunks alone, is comparatively rare. It occurs, however, sometimes in such a form—*i.e.*, with such distinct limitation to the muscles supplied by a particular nerve, and with such perfect freedom from all centric changes,—that we can refer the symptoms to derangement of the nervous functions only.

The special features of these hypercineses are,—their limitation to particular regions; their frequent chronicity; their freedom from co-ordination (*i.e.*, their want of that combined, and quasi-voluntary appearance presented by spasms, originating from disturbance of the emotional or sensori-motor centres), and the total absence of other intrinsic symptoms. The spasm may be either tonic or clonic; and although, in some cases referrible to organic disease of the nerve itself, or of some adjacent tissues implicating the nerve; it is, in other cases, independent of such alteration, and must be considered purely dynamic.

A. Facial Spasm is less common than facial paralysis. It is usually limited to one side of the face; and either all, or only some of the muscles supplied by the portio dura of the seventh nerve may be involved. The characteristic symptoms are—distortions of the features; grimaces of every kind, either alternating or persistent; and, in the latter case, leading to deeply marked furrows on the contracted side. These distortions are increased by speaking, laughing, or crying. The muscles of the alæ nasi, eyelids, and mouth, are peculiarly prone to suffer; and either group may be affected alone. Sometimes the cervical region has its muscles involved; but this is more rare.

At the commencement, sensorial changes occur (such as pain in the face, &c.); but they soon disappear.

B. Oculo-motor Spasm, inducing strabismus, is to be distinguished from the strabismus of paralysis by the persistence of some motor power in the antagonists of the contracted muscle (*i. e.*, in the muscles of the opposite side to that towards which the eyeball deviates), and by the combination with facial spasm (rather than with ptosis or lagophthalmia).

It is to be recognised as having a peripheral origin by the absence of those other intrinsic symptoms, which accompany strabismus from centric causes.

C. Laryngeal Spasm, the true "laryngismus stridulus" of children, may be known by paroxysmal dyspnœa, without cough; the attacks being at first of short, and subsequently of longer duration, and then attended by noisy inspiration. In the intervals of these attacks, the child exhibits no difficulty of breathing, nor cough, nor any signs of impaired health.

The attacks of dyspnœa occur most frequently at night, or upon first awaking from sleep. They are not occasioned by exertion; but, when severe, respiration may be suspended completely for a variable time; and spasmodic phenomena in the extremities, or general convulsions, may be induced.

The above signs, if carefully considered, are sufficient to diagnosticate laryngismus stridulus from pertussis, laryngitis, or paralysis of the laryngeal muscles.

§ V. ANÆSTHESIÆ.

Phenomenally, there is loss of sensation, of reflex impressibility, or of both. It is not easy to account for the separation of these functions by disease implicating the nervous cords alone; but it is quite certain that such separations are effected clinically. For example, there may be perfect amaurosis dependent upon lesion of the optic nerve, and yet the iris contracts upon exposure of the retina to light; and a similar distinction is not unfrequently observed with regard to the cutaneous nerves.

Any nerve may become anæsthetic, and the symptoms induced consist essentially in the absence of its special functions, whatever they may be. Absolute loss of sensibility is commonly accompanied by changes in motility and nutrition; which may be coetaneously produced, or may be the result of deficient sensation.

Cutaneous anæsthesia is often preceded by modified sensations, of various kinds, such as pain, numbness, tingling, &c.

The diagnosis of peripheral from centric anæsthesia has been already described in the chapter on diagnosis of locality generally. (See p. 58, *et seq.*) The means of distinction are,—the limited distribution of symptoms; their confinement to regions supplied by particular nerves, or branches of nerves; the implication of reflex functions; and the absence of further centric symptoms.

§ VI. ACINESES.

The special features of paralysis depending upon loss of conductive power in the nervous cords are,—limited extent (*i. e.*, isolation to the muscles of a particular nerve, or of one of its branches); loss of tonicity; loss of reflex, and electric contractility; the rapid loss of nutrition; and the freedom of the patient from centric disease.

Notwithstanding the many differences that exist between the opinions of those who have experimented upon the relations of paralysed muscles to electric stimulus, when the paralysis depends upon cerebral causes (such as hæmorrhage, softening, &c.), and affects a unilateral distribution; there is a general concurrence of testimony upon this point, that when the lesion or disease is of such a nature as to sever muscles from their functional connexion with the cord, the electric irritability is rapidly diminished, and ultimately lost. This was pointed out long since by Dr. Marshall Hall, and paralysis of this kind was denominated by him "spinal paralysis."* (Others, misinterpreting the expression, and understanding by spinal paralysis the loss of motility in dependence upon spinal disease, confounded two conditions essentially distinct; and asserting, what is quite correct, that paralysis, dependent upon spinal disease, and implicating only the conductive functions of the cord, does not necessarily involve the electric irritability of the muscles, they contradicted the statement of Dr. Hall with regard to spinal paralysis, but, using that term to denote a very different condition from that intended by Dr. Hall, unnecessary confusion and contradiction arose, from its very frequent source, the dissimilar application of the same expression). Lately Duchenne, Meyer, and others, have abundantly confirmed the original proposition of Dr. Hall, viz., that the muscles excluded from spinal influence lose their electric irritability; but they term this kind of paralysis "traumatic," intending by that word, lesion of the nervous cord, whether arising from external injury or from the development of organic disease, such as a tumor, pressing upon and impeding the function of the nerve.

Facial Paralysis. This is the most common local paralysis, and it needs some special comment, as it is liable to be confounded, in certain cases, with facial hemiplegia of cerebral origin.

The symptoms are loss of motility in the muscles supplied by the portio dura of the seventh nerve; the extent of paralysis, or the number of muscles affected, is determined by the seat of lesion—*i. e.*, its implication of a large, or small division, or of the entire trunk of the nerve; and the degree or completeness of the paralysis is in proportion to the severity of affection.

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* Medico-chirurg. Trans., vol. xxx., p. 207.

When only the peripheral portion of the nerve is affected, the facial muscles are alone involved; the eye remains open, winking movements cease, the eye loses its natural protection, and the conjunctiva becomes injected; tears are secreted in profuse abundance, and they flow over the cheek. The lips and alæ nasi are paralysed, whistling movement is impossible, and food frequently collects between the teeth and the cheek, owing to loss of power in the buccinator muscle. The muscles on the opposite side retaining their functions, there is deviation of the features, and this becomes excessive during the expression of emotion, by laughing, crying, &c.

When the nerve is affected within the temporal bone, as, for example, from caries of the latter, there may be extrinsic symptoms, such as otorrhœa, deafness, pain, &c.: and the intrinsic phenomena differ, owing to the implication of the chorda tympani, and petrosal nerves. The sense of taste is diminished, salivation is decreased, articulation is impeded, and the muscles of the palatine arch and uvula exhibit unilateral paralysis (known by flattening of the arch, and deviation of the uvula).

The important distinction from cerebral hemiplegia of the face may be established, by the absence of centric symptoms (*e. g.*, loss of perception and volition, &c.); by the paralysis of the orbicularis oculi, which is very rare in cerebral hemiplegia; by the loss of electric irritability in the muscles; by the extrinsic phenomena of disease in the temporal bone, or along the course of the nerve; or by the existence of such occasional causes as exposure to a draught of air, disease of the parotid gland, &c.

APPENDIX.

APPENDIX A.

THE SENSORI-MOTOR GANGLIA.

THIS term is used to denote certain ganglionic masses, or collections of grey vesicular matter, lying at the base of the brain; and included partly within the medulla oblonga, and partly within the cerebral hemispheres. These bodies have received the following more or less appropriate names:—

1. The olfactive ganglia; or bulbs of the olfactory nerves. In fishes these are of much larger size, in proportion to the cerebral lobes, than in man. They are distinctly pedunculated, and contain grey matter in their interior. The so-called olfactory nerve has been for a long time recognised to be in reality a tract of cerebral tissue; the true olfactory nerve is peripheral to the bulb, and the latter constitutes its sensorial centre.

2. The corpora quadrigemina. These bodies are placed in connexion with the optic nerves, the third pair of nerves, the anterior division of the spinal cord, and the cerebellum. In fishes, and in the lower vertebrata generally, they are of much larger relative size than in the higher vertebrata and in man. They constitute an important part of the "optic lobes;" and both comparative anatomy and physiological experiment concur with the results of clinical observation in showing that they are the true centres of the visual sense.

3. The grey nucleus of the posterior pyramid of the medulla oblongata (situated immediately beneath the floor of the fourth ventricle), which constitutes the auditory ganglion. It is placed in direct communication with the portio mollis of the seventh pair of

nerves; and in some fishes, for example in the carp, is as distinct a body as the optic ganglion.

4. The gustatory ganglion, in close proximity to the latter, to the corpus dentatum, and restiform nucleus. These little collections of vesicular nerve-substance are connected with the hypo-glossal, glosso-pharyngeal, and pneumo-gastric nerves.

5. The thalami optici. The "optic lobes" of fishes (osseous) contain not only the corpora quadrigemina, the true optic ganglia as already pointed out, but also the thalami optici; and in the human embryo of the sixth week, a distinct vesicle is found for the latter, situated between that of the corpora quadrigemina and that of the cerebral hemispheres. These thalami optici are placed in intimate relation with, and form the termination of, those fibres which constitute the sensory tracts, ascending from the spinal cord, and receiving fibres from the large divisions of the fifth pair of nerves. It appears probable that they constitute the centre of general sensation, and of the sense of touch.

6. The corpora striata. These bodies are homologous with the cerebral lobes in fishes, and in the early human embryo. They form the upper termination of the motor tracts; are placed in communication by means of the latter with the spinal accessory, portio dura of the seventh, the sixth, motor division of the fifth, the fourth, and third pairs of nerves, and with the anterior columns of the spinal cord. They appear to constitute the (immediate) centres of motor impulse for the two lateral halves of the body.

7. The cerebellum, connected, by its three peduncles, with the sensory centres, and with the motor and sensorial tracts, exercises an important function in the guidance of muscular movements, and in their combination and co-ordination, for the accomplishment of definite ends. This function appears to be performed in dependence upon sensational direction.

With regard to the functions of these ganglia, considered collectively, the following points may be considered as established:—

I. That they constitute the true sensorium, or centres of sensation proper. Experimental inquiry shows that the special senses become extinct when these ganglia are injured or destroyed; that the removal of the entire cerebral hemispheres (leaving these bodies) destroys all evidence of perception (the intellectual recognition, or "intuition" of external impressions); but that sensation is not affected in its relation to muscular action. Comparative anatomy, while it shows that there is some general agreement between the size of the cerebral hemispheres and the degree of intellectual endowment, exhibits the progressive increase of the sensori-motor ganglia in relation to the cerebral hemispheres, as the descent is made from the higher to the lower vertebrata. The lowest vertebrated animal presents nothing more than these ganglia as the entire of its intra-cranial nervous system. In the higher crustacea there is a similar arrangement.

It appears, therefore, that where the wants and actions of certain animals are of so limited a nature that sensation alone is sufficient for their accomplishment and general direction, the sensori-motor ganglia constitute the whole of their cranial nervous system. Where, on the other hand, intelligential perception and spontaneous action are required, there is the super-addition of cerebral hemispheres: and these hemispheres are developed in proportion to the complication of muscular movements required, and to the necessity for their adaptation to new circumstances and conditions. The former class of animals is ineducable; their habits are essential functions of their physical constitution, and all their movements are restricted within definite laws; but the latter class may be taught by circumstances, and new formulæ for muscular action may be created through the intervention of volition.

Clinically it is found that disease of the tubercula quadrigemina induces blindness; that lesion of the thalami is attended by loss of general sensation; but that affections of the cerebral hemispheres, removing perception and effective volition, do not at all necessarily impair sensation.

II. That they are (taken collectively) the organs engaged in the performance of a number of actions, not connected with volition, and not simply reflex, because attended by sensation. These movements are the sensori-motor, consensual or automatic; and thus these ganglia are not only the central organs of sensation, but those of certain motor impulses.

Physiological experiment shows that various rotatory and allied movements follow the injury or section of these ganglia on one side of the body. Rest is not the result of inaction, but of opposed and balanced action; and the inference from such physiological observations is, that the lesions described interfere with the establishment of this balance, by the unilateral removal of sensational stimulus. The experiments of Flourens upon the ear, and of Longet upon the eye, demonstrate that it is the sensational element in defect, and not the motorial element in excess, which is the cause of such phenomena. But they, at the same time, show that sensation is a constant occasion, or remote source of motor impulse; normally—*i. e.*, when equal on the two sides, producing equilibrium or rest; abnormally—*i. e.*, when unequal on the two sides, inducing rotatory or vertiginous movement. The reader is referred to a pamphlet upon "Vertigo,"* for a succinct history of the physiological experiments which warrant these conclusions.

III. That these ganglia have the power, not only of receiving sensorial impressions and of affording motor impulse, but of transforming the first into the second; and this without the (necessary) intervention of perception and volition. Daily observation proves the accuracy of this statement. There are many physiological movements of purely sensori-motor character, such as the direction of the eye-balls, the sudden starts which are occasioned by noises, &c., and these movements are frequently presented in excess as the result of dynamic or structural disease. The limitation of respiratory movement to one side of the chest in cases of pleurisy, is an example of the power which sensation exerts in the direction of muscular action.

IV. That these ganglia are in all probability the immediate sources of motor impulse in every act of which volition is the remote occasion. We cannot determine the contraction of a particular muscle or group of muscles by any effort of the will directed to the muscles themselves. It is by the direction of volition to the resultant movement, that the latter is effected. Many muscular combinations appear to be the result of connate endowments, such as those which the lower animals exhibit in their erect position and progression immediately after birth: others are acquired, or are the result of education, or volitional direction of movement towards the accomplishment of definite ends, under the guidance of sensation.

Many actions which at first require the constant direction of consciousness (attention) to their performance, become subsequently so facilitated by practice, that they may be maintained or even originated independently of any distinct volition. Thus, the child has to attend most diligently to its earlier steps; but the adult walks for hours together, without the slightest consideration of his limbs. These movements are very correctly termed "secondarily automatic."

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* "Vertigo," a paper read to the N. L. Med. Soc.

V. That these ganglia are probably concerned especially in the performance of emotional and instinctive movements. Comparative anatomy indicates that the instinctive actions must, in the lowest vertebrata and the higher invertebrata, be entirely dependent upon these bodies; and the close resemblance of such movements, and of those which accompany emotion, to the sensori-motor phenomena, in regard of both their special character, and their relation to volition, renders it highly probable that they are functions of the same organs. In the lower animals, and also in man himself, the immediate occasions of instinctive and emotional actions are sensorial impressions; and it has been shown by experiment, that many of the former are persistent, when the cerebral hemispheres are removed. The association of emotions with sensations and ideas, and the reproduction of such emotions, independently of any renewed impression, by a simple train of thought, is the cause of apparent complication and difficulty in the interpretation of such phenomena in man; but there is no reason to believe that the emotions, when becoming objective (*i. e.*, when displaying themselves by muscular movements, expressions of the face, gestures, &c.), do so in any other manner than the instinctive propensities of animals; although the emotion itself (subjectively considered) need not be dependent upon any property of the sensori-motor ganglia.

VI. That these ganglia may be affected by disease, either functional or structural; and that the symptoms of such morbid conditions resolve themselves into modifications of motility and sensation individually, but more commonly and distinctly into changes of their functional relationships. (See Chapter II., p. 34, &c.) The reader is referred to Dr. Carpenter's "Principles of Human Physiology," it being to the lucid discrimination of that author that we owe very much of our information upon the subject.

APPENDIX B.

◆

ON THE RELATION BETWEEN FUNCTIONAL CHANGES AND STRUCTURAL LESIONS.

Until very lately a large class of diseases was to be found in every nosology, and in the writings of almost every systematic author, denominated "dynamic," "functional," or "inorganic;" and in the present day, although this group is diminished, there are many affections which, for want of a better word, and a more advanced pathology, are termed "neuroses."

The belief is, however, daily extending and deepening, that no diseases of any kind (*i. e.*, that no morbid conditions of function, nor concatenations of symptoms), either can or do exist without correspondent physical changes in the organs. This belief arises from the fact that many of the so-called neuroses are, or may be, now distributed among more definable diseases, such as textural changes or morbid blood-conditions.

Are we warranted in believing that this distribution is possible with regard to all the neuroses, or functional diseases? If so, the terms "functional disease," "neuroses," &c., must be discarded from our nosology, or be used with the distinct understanding that they are provisional only, until further examination has rendered their employment no longer necessary. But if this reduction is not possible, we have no right to assume upon *à priori* grounds the impossibility of purely dynamic derangements; but we should endeavour to determine the existence or non-existence of ulterior changes as yet undetected; and to establish the laws of such morbid variations, so far as they may be discoverable by the old and by new methods of examination.

In endeavouring to answer the question, whether all dynamic disturbances can be referred to any of the pathologico-anatomical conditions at present recognised, the following general statements afford all necessary assistance:—

1st. That there are many diseases, such as epilepsy, hysteria, apoplexy, paralysis, &c., which sometimes occur without our being able to discover post mortem any physical derangement of the nervous centres, or of any other system of organs.

2nd. That there are many diseases of chronic duration, but of paroxysmal type, in which, during the intervals of attack, there is more or less perfect immunity from morbid symptoms.

3rd. That there are found, post mortem, changes of structure in the encephalon and spinal cord of individuals who have, during life, presented no symptoms of nervous derangement.

4th. That the lesions which are discovered in similar cases of disease assuming a paroxysmal type, are of very variable nature and locality; and, *vice versâ*, that the same lesions have co-existed with symptomatically different diseases.

5th. That the physical changes which are found in the nervous centres of those who have presented paroxysmal diseases—during the intervals of which paroxysms there may have been complete immunity from, or the presentation of, very different symptoms—are commonly of such kind that their production must have taken much time, and must in all probability have progressed during the intervals of seizure.

6th. That the lesions which are discovered are frequently of such a kind, or in such a locality, that they afford no direct explanation of the symptoms. For example, a spiculum of bone pressing upon the brain does not explain the occurrence of epileptoid paroxysms in the same manner that destruction of the thalami and corpora striata accounts for paralysis and anæsthesia.

7th. That the symptoms of many, commonly called dynamic diseases are precisely similar in essential characters to the processes of ordinary health, differing from them in degree, and in the time of their occurrence.

8th. That there are modifications in the functions of other organs analogous to those modifications in the functions of the brain and spinal cord, which are presented by dynamic diseases, without any appreciable change of their structure. For example, excessive action of the heart, or its opposite condition of syncope; modifications of secretion both in quality and quantity, &c., &c.

From these general data it must be inferred,—

A. That there are diseases—*i. e.*, there are groups of symptoms which must be considered to be functional changes.

B. That there are physically morbid conditions which do not reveal themselves by symptoms; and further,—

C. That when the two classes of morbid phenomena (dynamic and static) co-exist, such simple co-existence does not prove that they occupy the relation of cause and effect.

Allowing, then, as it is evident that we must in the present state of medical science, that there are functional derangements, which no anatomical lesions can explain, we are led to ask the questions, whether it is probable that these neuroses are the results or phenomena of changes in the essence of the nervous properties themselves, or whether they are the products of ulterior changes in the structure of the organs, or in the conditions of their stimulation?

The answers given to these questions may be based upon simply speculative grounds, or they may be the result of deduction from more general laws which have been established inductively. Speculation is of little or no value in the matter; the conclusion to which individuals will be led by such a method, will be in accordance with their several modes of thought, and hence idiosyncratic and diverse; rather than in any necessary conformity with the truth, which is universal and one.

If we attempt to answer the question deductively, there are arguments on both sides. Those who indulge the hope and belief that further examination will lead to the recognition of pathologico-anatomical conditions, similar to those with which we are already familiar, do so upon the following grounds,—

1st. That because many diseases, heretofore considered dynamic, have now been shown to depend upon a static change; as—for example, urinæmic convulsions, syncope from fatty heart, &c.—there is reason for believing that all diseases have a similar organic or structural basis, and that the latter would be discovered if equally minute observation were pursued in the right direction.

2nd. That because many diseases can be shown to be dependent upon certain physical changes, only of temporary duration, it is probable that some analogous conditions, as yet undiscovered, exist in all cases.

3rd. Because some organic change accompanies all vital activity, the morbid conditions of the latter must be referrible to morbid conditions of the former.

On the other hand it may be argued, that none of these commonly known pathological conditions exist,—

1st. Because, minute examination has failed to discover any persistent physical conditions upon which they could depend.

2nd. Because there is nothing to indicate the existence of any temporary physical changes during life.

3rd. Because the kind of organic change accompanying vital activity is merely a condition, or one of the phenomena of such action, and cannot be considered as its cause. The disintegration of a muscle which takes place during its contraction, is one of the phenomena of that contraction, and can no more be regarded as its cause than can the approximation of its two extremities.

4th. Because the phenomena which present themselves as the intrinsic symptoms of nervous disease, are nothing more in essential characters than the phenomena of health, differing from the latter in their relative intensity, in the form of their combination, and in their persistence.

The *onus probandi* lies therefore upon those who assert that there must be structural changes to account for functional disturbance, if they mean by such structural changes any of the morbid lesions found in our ordinary pathologico-anatomical categories. If all that is intended is that some physical change in the intimate organic processes of the tissues in question, must take place as the essential conditions of their activity; and that some diminution or perversion of these processes must attend the decrease or alteration ot their functions, there is not only *à priori* evidence, and the deductive application of general laws to warrant such an assertion, but there is direct clinical evidence of its truth: such as that, for example, given by Dr. Bence Jones, with regard to the modifications of the urinary secretion in respect of phosphates and sulphates, in cases of delirium tremens, chorea, &c. But these changes are totally distinct from those which are ordinarily meant by structural lesions, and are, as I have already said, conditions of vital activity, and not its cause.

It appears probable that there is a correlation between the several vital forces, similar to that which subsists between the different physical forces, and that the organic (vegetal) changes in the muscular fibres are related to the functional (animal) property of contraction, in the same manner that chemical decomposition is connected with the development of motion, for instance, in the magnetic needle. But neither can be considered as the cause or effect of the other. (For this view of the physical forces, we are indebted primarily to Professor Grove, who hints at the application of a similar mode of expression, with regard to the organic processes; but it is to Dr. Carpenter that we owe our more definite knowledge upon the subject. See "Philosophical Transactions for 1850," in which not only the correlation of the several vital forces is distinctly demonstrated; but these forces are shown to occupy a similar relation to the ordinary physical agencies, such as heat, light, &c.)

This mode of viewing the subject is of importance, not only in relation to those diseases in which no structural changes can be detected, but in reference to those which are connected with distinct pathologico-anatomical alterations. The immediate conditions of all such symptoms as result from modified functions being the intimate organic (vegetal) processes of the tissues, we can understand why similar symptoms arise from anatomical conditions presenting coarse differences, and *vice versâ*. The mechanical changes, such as hæmorrhage, congestion, softening, &c., do not cause the symptoms directly, but by the intervention of secondarily induced alterations in the minute organic processes.

It appears to me that we may thus solve the *vexata quæstio* of the existence of functional diseases, by affirming that they are dynamic in the same sense that muscular contraction and sensation are dynamic in their ordinary, healthy exercise; and the term has, therefore, been retained and applied in the preceding pages.

APPENDIX C.

ON THE RELATION BETWEEN VOLITION AND INVOLUNTARY MOVEMENTS.

From the clinical history of cerebral diseases, and from the results of physiological experiment, it is evident that the complete removal of volition does not necessarily induce any spasmodic phenomena; but it is commonly believed, and many facts appear to warrant the belief, that such removal enhances the probability, by increasing the facility of their production.

It is said that there is an antagonism between the cerebral and spinal functions, the volitional and avolitional, and this antagonism has been made to account for the occurrence of convulsive phenomena, when cerebral influence is removed; the loss of volition setting free, as it were, the power of involuntary movement.

It has appeared to me that this antagonism is an assumption in some cases, and that it is sometimes quoted in explanation of phenomena without any sufficient reason; and in order to limit the employment of this idea to its proper objects, I have endeavoured to state the facts which are established upon the matter at issue in a propositional form.

1st. Those reflex movements which are normal in character are not ordinarily opposed by volition. For example, deglutition and respiration do not call forth any antagonism from the will.

2nd. If attention is directed to their performance, they at once become unnatural: the movements are postponed, or rendered clumsy, by combination with ideo-motion and voluntary effort, and the conditions of stimulation being deranged or removed, the act may be averted.

3rd. If the appropriate stimulus be brought to bear upon the sensory, or recipient surface, no amount of volition can check or prevent an essentially reflex movement. For example, it is impossible to hold the breath, or to restrain a cough or sneeze beyond a certain point.

4th. When volition is removed, ordinary reflex actions are performed no more readily than in health, but they continue in precisely the same condition. As illustrations of this we may allude to the contraction of the iris in apoplexy, the acts of swallowing and respiration when the brain is removed by experimental lesion, which maintain their normal relation to their appropriate stimuli.

5th. When volition is preserved, there is an innate tendency and capacity to resist such involuntary movements as are abnormal; whether these arise from extraordinary stimuli, or from an excessive susceptibility of impression. Thus we resist the motor effects of tickling, and any spasmodic movements which arise from exaggerated reflexion. This power is especially successful in the control of sensori-motion, but its influence upon the purely—*i. e.*, asensual reflective movements, is trivial.

6th. When volition is removed, abnormal and pathologic reflex actions are readily induced; thus irritation of the soles of the feet in paralysed limbs produces contraction of the muscles more easily than in those which are under the control of the will. In some cases this is very highly marked, in others much less so, although equally paralysed to volition; and it is in cases of palsy from spinal disease, that it reaches its maximum of development; many cases of cerebral hemiplegia presenting no increase of reflection.

From these general data we may infer,—

A. That normally there is no antagonism between the will and the reflective actions of healthy life.

B. That there is an antagonism to unnatural involuntary movements from whatever source they arise.

C. That this antagonism being removed by anything which interferes with volition, abnormal reflex actions are rendered probable, but by no means necessary or excessive.

D. That the removal of this antagonism, by interference with volition, does not account for all the exaggeration of reflex actions.

E. That those cases of paralysis, in which there are the phenomena of excessive reflection, are complicated with another diseased condition of the reflective centre.

INDEX.

ACINESES, from
  disease of nerves, 232
  (see paralysis)
Acute diseases,
  meaning of word, 7
  of brain, 63
  of spinal cord, 206
Albuminuria, 111
Anæmia,
  with apoplectic symptoms, 113
Anæsthesia,
  definition, 29
  muscularis as a symptom, 21, 35
  as a disease, 165
Anæsthesiæ from disease of the nerves, 232
Anatomical condition, as third problem, 11
Antagonism between cord and brain 245
Apoplectic diseases,
  (see congestion, hæmorrhage, softening, &c.)
  meaning of word, 64
  list of, 90
Apoplexy, 91
Apprehension,
  unusual quickness, 15
  loss of, 16
Attention,
  deficiency of, 15

Brain, diseases of
  diagnosis from those of cord and nerves, 57
  from meningeal, 61
Catalepsy, 173
Carus, definition of, 45
Centric functions of cord, 203
Cephalalgia,
  different forms, 139
Cerebritis (see softening)
  general, 82
  local, 83
Chorea, acute, 138
  ordinary form, 158
Chronic diseases,
  generally, 8
  of brain, 68
  of spinal cord, 217
Classification
  of anatomical conditions, 10
  of diseases, 48
Columns of cord, 200
Coma, definition of, 45
Combined excess and defect of function, diseases marked by, 69
Concussion of cord, 216
Conductive functions of cord, 201
Congestion of brain,
  febrile form, 88
  apoplectic form, 91
  delirium form, 115
  convulsive form, 130
Congestion of cord, 207
Consciousness, loss of, definition, 19
Continued fever, 84
Control of involuntary movement, 21
Convulsion, definition of, 44
Convulsive diseases,
  diagnosis of group, 66

Convulsive diseases,
    list and classification of, 123

Delirium, definition, 19
    diagnosis of, generally, 65
    diseases marked by, 115
    tremens, 118
Delusions, definition, 25
Diabetes, with apoplectic symptoms, 112
Diagnosis of three objects, general means for arriving at, 12
Diathetic diseases (see extrinsic, urinæmia, &c.)
Diminished function, as mark of group, 69
Direction of movement, 21
Dorso-intercostal,
    neuralgia, 230
Dura mater,
    inflammation of, 82
Dynamic, diseases, 10, 240
Dysæsthesia, definition of, 30

Eccentric convulsions, 123
Eccentric irritation,
    convulsions from, 125
Electric irritability,
    generally, 41
Elements for diagnosis, 13
Emotion,
    symptoms referrible to, 25
    as source of action, 25
    as a state, 26
Emotional movements, 34
Encephalon,
    diagnosis of parts, 3
Epilepsy,
    relation to brain, 143
    relation to other diseases, 173
    interparoxysmal phenomena, 178
    symptoms of attack, 179
    induration of brain, 195
Epileptics,
    classification of, 181
Epileptoid convulsions, 44
Exaltation of function, 68
    diseases marked by, 144
Extrinsic diseases,
    definition of, 2
Extrinsic diseases,
    diagnosis, 52
Extrinsic symptoms,
    generally, 45

Facial neuralgia, 229
Facial paralysis, 233
Facial spasm, 231
Febrile diseases, 8
    diagnosis of group, 63
    list of, 70
    differential diagnosis, 71
Fever continued, 84
    gastric remittent, 87
Fibrinous concretions in vessels, 114
Function,
    exaltation of, 144
    diminution of, 164
    excess and defect in combination, 168

Gastric remittent fever, 87

Hæmorrhage, cerebral, 94
    apoplectic form, 95
    convulsive form, 136
    „ ventricular, 99
    „ arachnoid, 100
    „ spinal, 215
    „ tuber annulare, 216
Hallucinations, distinction from illusions, 150
Hemicrania, 148
Hydrocephalus (see tubercular meningitis)
    chronic, 196
Hydrophobia, 214
Hypæsthesia, definition, 29
Hyperæmia (see congestion)
Hyperæsthesia,
    definition of, 28
    distinct from dysæsthesia, 30
Hyperæsthesiæ, 138
Hyperalgesia, 29
Hypercineses, 231
Hypertrophy of brain,
    convulsive, 138
    in infants, 194
    in adults, 195
    from lead, 195

Hypertrophy of brain,
    in epileptics, 95
Hypertrophy of co 220
Hypochondriasis, 14[illegible]
Hysteria, 168
    relation of attacks to interparoxysmal state, 169
    mental state in, 170
    why among diseases of the brain, 143

Icteric disease, with apoplectic symptoms, 112
Ideation,
    symptoms referrible to, 22
    relation to impressions, 23
    as independent process, 23
    sequence of, 24
    exaggeration of, 24
    perversion of, 25
    relation to motility, 25
    excessive, 145
Ideo-motion, 33
    increased, 33
    diminished, 34
Idiopathic convulsions, 128
    „ paraplegia, 221
    „ tetanus, 213
Illusions, 151
Induration of brain, 193
    (see hypertrophy)
Induration of cord, 220
Intensity of sensations,
    how regulated, 28
Intrinsic convulsions, 128
Intrinsic diseases,
    definition, 3
    diagnosis from extrinsic, generally, 52
Intrinsic symptoms,
    definition of, 14
    mental, 14
    non-mental, 27
Irritability of muscles,
    to electricity, 41
    to percussion, 42

Laryngismus stridulus, 231
Lead poisoning,
    induration of brain in, 195
Locality of affection,
    first problem, 2
    diagnosis of, generally, 52
    in spinal cord, 198
Loss of consciousness, 19

Mania, acute febrile, 89
Mania, dancing, 147
Meningeal disease,
    diagnosis from central, 61
Meningitis, cerebral,
    simple, 71
    tubercular, in child, 75
    „ in adult, 77
    rheumatic, 80
    tubercular, with apoplectic symptoms, 107
    tubercular, with convulsive symptoms, 133
    chronic, 187
Meningitis, spinal,
    acute, 208
    chronic, 219
Meningo-myelitis, 212
Mental symptoms, 14
Morbus Brightii,
    apoplectic symptoms, 108
    peculiar coma, and stertor of, 109
    convulsive form, 125
    chronic, 197
Morbus cordis, with apoplectic symptoms, 62
Motility, symptoms referrible to, 32
    relation to volition, 32
    excessive, 20 (see volition, emotion, sensation)
Muscular sense,
    diminution of, 165
Muscular tic, 175
Myelitis,
    acute, 210
    meningo, 212
    chronic, 217

Nature of affection, second problem, 6
Nerves,
    diseases of, distinguished from those of brain and cord, 57
    diseases of, generally, 222

Nerves,
    relation to symptoms, 223
Neuralgia, 228
Neuritis, 225
Neuroma, 227
Neuroses, character of, generally, 240
Non-febrile diseases, 8

Objects of diagnosis, 1
Organic symptoms of spinal disease, 205

Painful sensations, 30
Paralysis agitans, 163
Paralysis of facial nerve, 233
Paralysis, meaning of word; varieties of (see motility), 32
Paraplegia, idiopathic, 221
Percussion of muscles, 42
Plethora spinalis, 207
Problems stated, 1
Pseudæsthesiæ, 31

Recollection, 16
Reflective movements,
    in excess, 36
    deficient, 39
Regions, of spinal cord,
    diagnosis of, 198
Rigidity in hæmorrhage, 96

Sciatica, 230
Sensation,
    in spinal disease, 202
Sensibility,
    examination of, 30
    relation to impressions, 28
Sensori-motility, 34
Sensori-motor ganglia,
    enumerated, 4
    functions, 235
Serous effusion,
    apoplectic form, 100
Softening of brain,
    acute febrile, 82
        „ apoplectic, 102
        „ delirious, 117
        „ convulsive, 132
    chronic, 190
Softening of cord,
    acute, 210
    chronic, 217
Spasm, co-ordinated, 157
Spectra, 154
Spinal cord,
    object of diagnosis, 5
    diseases of, diagnosticated from brain and nerves, 57
    locality affected, 198
    diseases of, as to general nature, 201
Spinal meningitis (see meningitis)
Spinal paralysis,
    definition, 39
    relation to electricity, 233
Spirits the, definition of, 26
Strabismus, 231
Subcutaneous tubercle, 227
Subjective sensations,
    different kinds of, 31
Stertor, generally, 40
    of urinæmia, 110
Symptoms,
    relation to structure, 49
    Appendix B., 240

Tarantism, 147
Temper, 27
Tetanus, 213
Third problem, 10
Thought, its direction by volition, 16
Tonicity, variations of, 44
Tonic spasm, relation to clonic, 204
Toxæmic convulsions, 123
Trachelismus,
    a symptom, 37
    in epilepsy, 176
Tubercle of brain, 135
Tubercular meningitis,
    febrile form, 75
    apoplectic form, 107
    convulsive form, 133
Tumor of brain,
    apoplectic form, 105
    convulsive form, 135
    as chronic disease, general diagnosis, 182

Tumor of Brain,
    special forms, 185
    special localities, 186
Tumor of cord, 220
Tumor of nerves, 227
Tremors, 163
Typhoid and typhus, febrile diseases, 84

Urinæmia,
    apoplectic form, 107
    convulsive form, 125
    chronic form, 197

Valvular diseases of heart,
    detached vegetations, with softening, 114
Vascular obstruction, 114
Vertigo,
    of motion, 156
    of sensation, 153
Volition,
    symptoms referred to, 15
    relation to ideation, 15
        „ emotion, 17
        „ sensation, 18
        „ motility, 19

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